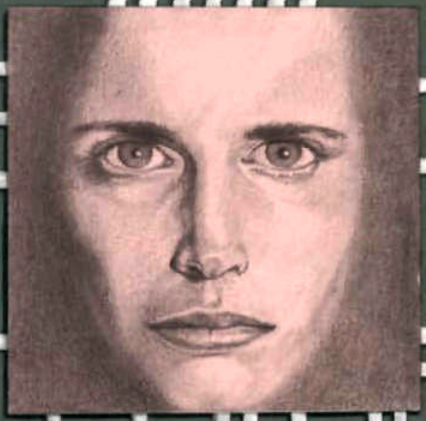
SKEPTICAL INQUIRER

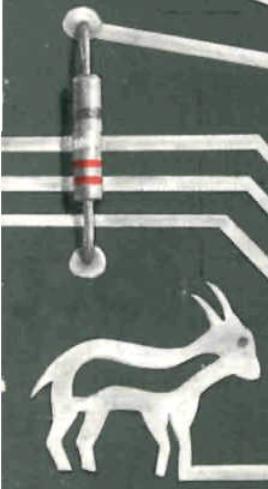
Vol. 16, No. 4 Summer 1992 / $6.25

PSYCHIC EXPERIENCES EXPLAINED

Illusions of Causality

The Scientist's Skepticism
The Paranormal's Popularity
Self-Help Books / Ghost Lights





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SKEPTICAL INQUIRER

Vol. 16, No. 4, Summer 1992

Journal of the Committee for the Scientific Investigation of Claims of the Paranormal

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CSICOP LEGAL DEFENSE FOUNDATION

Help Us Defend Skepticism Against Harassing Suits

In the Winter 1992 issue of the *Skeptical Inquirer* we outlined the difficulties that the Committee for the Scientific Investigation of Claims of the Paranormal is experiencing because of harassing lawsuits filed against skeptics.

We feel confident that these suits will eventually be dismissed. Still, we suspect that the lawsuits were brought for reasons other than the redress of alleged grievances.

For what do these suits mean? They mean that the pro-paranormalists think they have finally found a way to strike below the belt of scientists and skeptics. For years they have been unable to prove their claims of miraculous abilities. They've grown tired of hearing our challenges. Now they have turned to intimidation by lawsuit in an effort to silence their only persistent critics.

It doesn't necessarily matter if the plaintiff wins or loses the suit. Their purpose is to waste their opponents' resources and to intimidate and silence them—in effect, depriving individuals or organizations of their First Amendment rights.

We are by no means a wealthy organization, but we are not prepared to surrender our rights. *We have vowed to fight back.* To do so, we need your support. CSICOP has established the CSICOP Legal Defense Foundation. Its funds will be used to help pay the costs of existing lawsuits and any that may arise in the future, and to countersue when appropriate.

Don't allow the claim-mongers to destroy CSICOP (and the values of science and reason it steadfastly represents) through unjust and frivolous legal proceedings. Support the CSICOP Legal Defense Foundation today. It's the best way to blunt this frightening new weapon of the apostles of nonsense.

— —

Yes, I want to help defend the rights of skeptics. Enclosed is my tax-deductible contribution of: $ _____

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From the Chairman

Freedom of Scientific Inquiry Under Siege

PAUL KURTZ

The skeptical community is under heavy siege. Pro-paranormalists, in an effort to silence their critics, have embarked upon lengthy and costly litigations. There are four libel suits against skeptics now under way, three of them brought by Uri Geller, the alleged psychic.

As I wrote in the Winter 1992 SKEPTICAL INQUIRER, Geller is suing James Randi and the Committee for the Scientific Investigation of Claims of the Paranormal for remarks attributed to Randi in an interview published last year in the *International Herald-Tribune*. This lawsuit, brought in Washington, D.C., has already cost CSICOP almost $100,000 in legal fees.

I met Uri Geller for the first time on March 13 in Washington, where both Randi and I had been summoned by Geller's attorney to give depositions in connection with the *Herald-Tribune* suit. The next two days of questions and answers included many heated, often acrimonious exchanges, largely between Geller's attorney and ours.

I did not know, until I returned to Buffalo the following Monday, that Geller, an Israeli citizen living in London, England, had initiated still another libel suit, in Miami, Florida, the day before we met. This suit was filed against Professor Victor Stenger, a distinguished physicist at the University of Hawaii, and Prometheus Books, because of a passage in his book *Physics and Psychics* (published by Prometheus), and it names me because of a passage published in my book *The Transcendental Temptation*, also published by Prometheus. Still another suit has been filed in London, England, against Victor Stenger and Prometheus Books. This suit also names Michael Hutchinson, a well-known skeptic and a distributor of Prometheus Books, for marketing Stenger's book in Britain.

I should point out that Prometheus Books is an independent company, entirely separate from CSICOP. It is virtually the only company in the world that consistently publishes books providing skeptical critiques of paranormal claims.

Both Stenger and I devote considerable space in our books to the scientific analysis of the claims of psychics. The suits against us, however, concern a single event that occurred in Beersheba, Israel, in December 1970, which was reported in the *Jerusalem Post* and other newspapers at that time. According to one article, the Magistrate's Court of Beersheba "upheld charges that Uri Geller, the self-proclaimed telepathist, was guilty of breach of contract in that he promised to perform feats of telepathy, parapsychology, hypnotism, and telekinesis, while in fact he merely employed sleight-of-hand and stage tricks."

In his own book, *The Geller Effect*, Geller writes, "A student named Uri Goldstein decided that he had been deceived by the poster used to advertise the show. It had promised a demonstration of psychic powers, but in his opinion it was just another

display of stage magic. So he went along to the local civil court and made a complaint against my promoters, a firm called Solan, and me. . . . The court heard and upheld his complaint, and he was awarded the price of his ticket plus costs, all of which came to the equivalent of a few American dollars." Geller continues, "Eventually, I was able to obtain documentary evidence from Hashalom Civil Court that the complaint was heard *in my absence.*"

According to papers filed by Geller, both Stenger and I "have libeled and defamed the Plaintiff by their reporting of an incident that occurred in December, 1970, in Beersheba, Israel, involving the Plaintiff, who was named but never served with process nor did he make any appearance in a civil matter."

Geller takes issue with descriptions of these events given by Stenger and me. Because these descriptions are the subject of litigation we feel constrained from reprinting them here.

Stenger and I deny that malice was intended on our part. We have volunteered, if there are any errors, to insert errata sheets in our books and to correct future editions. Geller has ignored these offers but, in a letter to our attorneys, has demanded (1) that we take out full-page ads of apology in major newspapers, (2) that we delete any and all references to him entirely from our books, and (3) that we pay $1 million in damages. He has since raised the claim for damages to $8 million!

As our readers know, over the years many skeptics have contested Geller's claims that he is able to bend or break metal and stop watches by means of psychokinesis and is able to read minds and see the contents of sealed envelopes by psychic means. If any of these claims were true, it would have extraordinary implications for our scientific understanding of the world. James Randi has shown that many allegedly paranormal feats can be performed by magicians using sleight of hand and other conjuring tricks.

In the suit recently filed in Miami against Stenger and me, Geller states: "In truth and fact, Plaintiff was not brought to court in Israel for using the words psychokinesis, ESP, and parapsychology in his promotion, and he was never prohibited from doing so in the future, and he was not and has never performed conjurer's tricks."

On page 161 of his book *The Geller Effect,* however, Geller admits that in 1970 his promoter "thought it would be a good idea to add some trickery to the genuine displays of psychic power. . . . I thought this was a stupid idea and I told him so, but he insisted and I finally agreed to keep him quiet."

Because in libel suits truth is an absolute defense (or, more precisely, the plaintiff must prove falsity), skeptics may have an excellent opportunity to challenge Geller to prove under controlled conditions that he can do what he claims.

Geller has expended great effort on his suits against CSICOP, James Randi, Victor Stenger, Prometheus Books, Michael Hutchinson, and myself. Unfortunately, when we are sued, however frivolous the charge, we have to defend ourselves, and the process is costly.

An even graver issue, however, is the need to defend the First Amendment. If such obstacles are placed in the way of scientific research, and if one cannot question extraordinary claims, then this could be a serious blow to science.

We, for our part, pledge to continue the defense of freedom of scientific inquiry, and we will not be intimidated, for what is at stake is the very integrity of science itself. □

The Committee for the Scientific Investigation
of Claims of the Paranormal
announces the

1992 CSICOP Conference

at the **Harvey Hotel** in

Dallas, Texas

Friday, Saturday, and Sunday
October 16, 17, and 18, 1992

FAIRNESS, FRAUD AND FEMINISM: CULTURE CONFRONTS SCIENCE

Keynote Address
(Friday at 8:30 P.M.)

Richard Dawkins

distinguished professor of zoology at Oxford University,
author of *The Blind Watchmaker* and *The Selfish Gene*

Friday, October 16

7:30 - 9:00 A.M.: Registration

9:00 - 9:15 A.M.: Opening Remarks — **Paul Kurtz,** CSICOP Chairman

9:15 A.M. - 12 NOON: MULTICULTURAL APPROACHES TO SCIENCE: THE GOOD, THE BAD, AND THE UGLY

Moderator: **Eugenie Scott,** Executive Director, National Center for Science Education
Bernard Ortiz de Montellano, professor of anthropology, Wayne State University
Diana Marinez, professor of biochemistry, Michigan State University
Joseph Dunbar, professor of physiology, Wayne State University

12 NOON - 2:00 P.M.: Lunch Break

2:00 - 5:00 P.M.: GENDER ISSUES IN SCIENCE AND PSEUDOSCIENCE

Moderator: **James Alcock,** professor of psychology, Glendon College, York University, Toronto
Susan Blackmore, psychologist, University of Bristol, U.K.
Carol Tavris, social psychologist, author of *The Mismeasure of Woman*
Steven Goldberg, professor of sociology, City College, City University of New York, and author of *The Inevitability of Patriarchy*

Friday (continued)

5:15 - 6:15 P.M.: Reception (Cash Bar)

6:15 - 8:30 P.M.: Dinner

THE FUTURE OF SKEPTICISM: THE PRICE OF REASON

with the CSICOP Executive Council, Paul Kurtz, James Alcock, Barry Beyerstein, Susan Blackmore, Kendrick Frazier, Ray Hyman, Philip J. Klass, Joe Nickell, and Lee Nisbet

8:00 P.M.: KEYNOTE ADDRESS

Richard Dawkins, professor of zoology, Oxford University, and author of *The Blind Watchmaker* and *The Selfish Gene*

Saturday, October 17

8:00 - 9:00 A.M.: Registration

9:00 A.M. - 12 NOON: FRAUD IN SCIENCE

Moderator: **Elie Shneour,** Director, Biosystems Research Institute
Paul Friedman, professor of radiology, School of Medicine, University of California, San Diego, at La Jolla
Clark Glymour, professor of philosophy, Carnegie-Mellon University
Walter Stewart, National Institutes of Health

12 NOON - 2:00 P.M.: CSICOP Luncheon

Sergei Kapitza, editor of Russian edition of *Scientific American*; member Russian Academy of Sciences
Evry Schatzman, former president, French Physics Society; member French Academy of Science

2:00 - 5:00 P.M.: Two Concurrent Sessions

Session 1. CRASHED SAUCERS

Moderator: **Philip J. Klass,** leading investigator of UFO claims and former senior editor of *Aviation Week and Space Technology*
Robert Young, education director, Harrisburg Astronomical Society
James McGaha, Major, U.S. Air Force (ret.), Tucson, Arizona
Kevin Randle and **Donald R. Schmitt,** authors of *UFO Crash at Roswell*

Session 2. THE PARANORMAL IN CHINA

Moderator: **Paul Kurtz,** CSICOP Chairman and professor emeritus of philosophy at the State University of New York at Buffalo
Guo Zheng-yi, Shen Zhen-yu, Weng Shi-da, and **Dong Guang-bi,** members of the Chinese Association for Science and Technology; **Lin Zixin,** former editor-in-chief of China's *Science and Technology Daily*; **Yu Li,** journalist and magician

6:00 - 7:00 P.M.: Reception (cash bar)

7:00 - 10:00 P.M.: Awards Banquet

Entertainment by **Steve Shaw,** mentalist, magician and "Project Alpha" alumnus

(Continued on next page.)

Sunday, October 18

9:00 A.M. - NOON: Conversation Session

Screening of CSICOP video.

Sunday morning Tour of Dinosaur Valley State Park: See the Paluxy River footprints and the fossil imprints left by giant reptiles of eons past. Dr. Ronnie Hastings, an expert on the Paluxy River footprints, will be our tour guide. The bus will leave at 8 A.M. and arrive back at the Harvey at 1:00 P.M. A complete box lunch will be provided ($31.50 per person)

This conference is hosted by the North Texas Skeptics, an independent, autonomous organization.

REGISTRATION FORM

Preregistration is advised. (Students 25 or under with I.D., $25.00. Registration fee does not include meals or accommodations.) Mail to:

1992 CSICOP Conference, P.O. Box 703, Buffalo, New York 14226

☐ YES, I (we) plan to attend the 1992 CSICOP Conference in Dallas.

☐ $125 registration for _____ person(s), includes Keynote Address. $ _____

☐ $15.00 Friday Dinner for _____ person(s) $ _____

☐ $15.00 Saturday Luncheon for _____ person(s) $ _____

☐ $25.00 Saturday Awards Banquet for _____ person(s) $ _____

☐ $10.00 nonregistrant ticket(s) to Keynote Address for _____ person(s) $ _____

☐ $31.50 Tour of Dinosaur Valley State Park and Box Lunch for _____ person(s) $ _____

☐ Charge my ☐ VISA ☐ MasterCard ☐ Check enclosed Total $ _____

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City _____ State _____ Zip _____

Phone: (day) _____ (evening) _____

☐ No, I will not be able to attend the conference, but please accept my contribution (tax-deductible) of $ _____ to help cover the costs of this and future CSICOP events.

Note: The CSICOP Hospitality Room will be open at 5:00 P.M. on Thursday, October 15 (cash bar 7:30 to 11:00 P.M.). This room will be available for the entire conference.

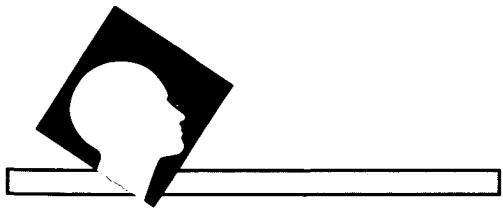
Accommodations: The Harvey Hotel, near the Dallas-Fort Worth Airport, Highway 114 at Esters Blvd., 4545 W. John Carpenter Freeway, Irving, TX 75063. Free parking. **Single $68.00, double $68.00** (plus 11% tax). (The Harvey will arrange shared doubles upon request.) These special rates will be available from October 13 through October 19. For reservations call 214-929-4500, FAX 214-929-0733. Benton's restaurant, Scoop's Diner, Cassidy's Lounge, and the Lobby Bar are on the premises, and the hotel will provide free transportation to Restaurant Row. Complimentary coffee will be available in the lobby for hotel guests.

Transportation: For special conference airline rates call CSICOP's travel agent, Judy Pensack, **Creative Destinations, 800-572-5440** or **FAX 407-830-5530,** who has arranged discounts. **Free transportation** to and from DFW Airport to the Harvey Hotel.

For more information, call or write to Mary Rose Hays at CSICOP, Box 703, Buffalo, New York 14226 / Telephone: 716-636-1425, FAX 716-1733.

Media representatives should contact Barry Karr: 716-636-1425.

News and Comment



Who Believes in Astrology and Why? Surveys Give Some Surprising Insights

Most surveys of belief in things paranormal have a frustratingly superficial quality to them. Too often they leave the scientifically inclined person wondering just what the results do or do not reveal. The 1990 Gallup poll of American adults described recently in these pages (Winter 1991) overcame some of these objections, but although detailed, it was based on telephone interviews and had some shortcomings (Letters, *SI*, Summer 1991, and next story).

Now a series of surveys by academics in France, the United Kingdom, and the United States give a more in-depth look at belief in astrology and related matters. They provide demographic and other useful variables that help us to understand *who* believes and, more important, some reasons *why*.

These studies were national random-sample surveys devoted primarily to estimating levels of public interest in, understanding of, and attitudes toward science and technology. Part of the motivation for the studies was the increasing awareness that both democratic processes and economic competitiveness depend on a scientifically literate population and work force. The surveys all asked questions about astrology and other nonscientific or pseudoscientific beliefs as a way of understanding public confusions and misunderstandings about science.

Results were reported in a half-day session on "Astrology and Other Pseudoscience" at the 1992 annual meeting of the American Association for the Advancement of Science in Chicago in February. The symposium was organized by Jon D. Miller, director of the International Center for the Advancement of Scientific Literacy, Chicago Academy of Sciences, who also presented one of the main papers. Others providing new survey data were Daniel Boy and Guy Michelat of the University of Paris and the Fondation Nationale de Sciences Politique in Paris; John Durant and Martin Bauer of the Science Museum in London; and Tom W. Smith of the National Opinion Research Center at the University of Chicago.

Here are some of the key findings and conclusions:

- Most people who follow astrology do so very casually; the serious, hard-core believers are a fairly small fraction of the population: 4 to 6 percent in the U.K. In the U.S. the fraction of those who say they change their lives due to astrological guidance is also fairly small, about 5 percent; still, as Miller notes, that amounts to about 8 million people.
- Belief in astrology in the United States, by three separate measures,

"Paradoxical as it may seem, therefore, we conclude that popular support for astrology may be part and parcel of modernity itself."

JOHN DURANT AND MARTIN BAUER

declined between 1979 and 1990. Those who think "astrology is at least sort of scientific," for example, declined 10 percentage points, from 50 percent to 40 percent; most of that drop, reports Miller, took place between 1983 and 1985.

- Astrological belief is strongly related to gender. In all three countries, belief in astrology is significantly higher among women than among men—two to three times higher by some measures in some demographic subcategories. The British survey found gender the single most important variable, among the 12 assessed, predicting higher astrological belief.
- People who believe in astrology tend to have high religious interest but low levels of integration into established religious structures—they tend to be disconnected from organized religion.
- Believers in astrology likewise tend to come from more marginal family and employment situations than nonbelievers—especially in France: People living together, those who are divorced, and those who rate their risk of future unemployment highest express greater interest and belief in astrology than those in more settled circumstances.
- Astrological belief is also related to the extent to which people feel they are in control of their social world—low control is related to higher belief in astrology.
- It may be surprising to science-minded people, but belief in astrology does not appear to be correlated with an inadequate understanding of science or to a negative attitude toward science. In Britain, believers tend to be those with *intermediate* levels of understanding of science; those with higher or lower levels of understanding believe in astrology to a slightly lower degree. "Belief in the pseudoscience does not seem automatically linked to mistrust of science," says Daniel Boy.
- Astrological belief also tends to be correlated with age (highest among young people) and with middle-class occupations (clerks, merchants, office workers).

These findings seem to support some commonsense hypotheses offered by the scholars to explain belief in astrology and other pseudo-sciences. "In view of these results," says Daniel Boy, "we can erect the hypothesis that belief in paranormal phenomena is linked to the degree of uncertainty about a person's social future. Thus, it is in youth, when the spread of possibilities for the future is at its widest, that uncertainty is felt most intensely. Similarly, in our societies women probably have fewer effective possibilities to choose their social futures than men do. And the social potential is more open—hence more uncertain—among the middle class."

"Paradoxically, the boom in

UFOs as ET Spacecraft? Belief Strong, Steady

Jon D. Miller's surveys in 1985, 1988, and 1990 also asked American adults whether they believed "some of the unidentified flying objects reported are really space vehicles from other civilizations." Despite the views of scientists on these matters, says Miller, a majority of Americans still answer yes to this question. There is no evidence of a change in this view: 54 percent in 1985, 57 percent in 1988, and 54 percent in 1990.

"Interestingly, the acceptance of the idea of UFOs from other civilizations is unrelated to the level of formal education, with a majority of both high school dropouts and college graduates embracing the idea. There is no significant difference between men and women in their acceptance of the UFO idea," says Miller.

Miller attributes the belief partly to popular movies and television programs and partly to a lack of understanding of the massive scale of the universe, which makes visits to earth from any alien civilizations exceedingly unlikely.

—*K.F.*

pseudosciences may be less a result of a weakened confidence in science than of the collapse of orthodox religious faith," says Boy.

Durant, who surveyed British attitudes, echoes Boy's conclusion: "From these results it would appear that interest in science and scientific understanding are not significant contributors to variations in belief in astrology."

Durant and Bauer, noting that they risk a caricature, summarize what their data show about supporters of astrology this way: "Such people tend to be: female rather than male; single rather than married; younger rather than older; and religiously motivated rather than religiously indifferent."

Durant and Bauer consider at least three different ways of thinking about belief in astrology:

One, that it is an "anachronism," a throwback to prescientific thinking; this is a tempting way for scientists to think of it, Durant notes. Second, it can be viewed anthropologically, as an alternative world-view deserving of attention and respect in its own right; in this approach no value judgments are offered. Third, it may be regarded sociologically, "as one among a number of potential compensatory mechanisms that may be available to individuals who are struggling to come to terms with particular aspects of modern culture." This is his approach.

Durant and Bauer's data about high religiosity but low religious integration, for example, support an earlier hypothesis that astrology feeds upon "metaphysical unrest." This is described as a desire for the recovery of a sense of the sacred and a sense of unity on the part of people whose social experience has undermined those things. "We are able to confirm that astrology has particular attractions for those who may be experiencing metaphysical unrest," Durant and Bauer say. "In Britain it seems, as in France, astrology is a phenomenon of particular social groups; groups which, as we have indicated, may be experiencing some difficulty in accommo-

dating their religious values to modern life in an industrial culture. Paradoxical as it may seem, therefore, we conclude that popular support for astrology may be part and parcel of modernity itself."

Miller's series of surveys for the National Science Foundation disclose the U.S. decline in belief that astrology is scientific, and also similar declines in those who read horoscopes often and who change behavior in response to them.

Women in the United States are more likely than men to think that astrology has some scientific basis (45 percent to 33 percent), and they are significantly more likely to be regular readers of horoscopes (23 percent for women, 9 percent for men). Women are twice as likely to report that they change their behavior due to an astrology report (6 percent for women, 3 percent for men). Among those with less than a high school education this disparity rises to a factor of 3 (9 percent for women, 3 percent for men).

Miller's trend lines point to a strong surge of astrology-related changing of behavior in the early 1980s but a relative decline since then. He finds that only 1 or 2 percent of college graduates reported making any changes in their behavior due to astrology reports.

"In summary," says Miller, "a substantial portion of American adults are still confused about the scientific standing of astrology, with approximately 2 of 5 American adults still thinking that astrology is at least sort of scientific. Only about 1 in 5 Americans read a horoscope regularly, but only 1 in 20 Americans actually change their behaviors due to what they read in astrology reports. The data from the last decade point to a continuing growth of public recognition of the nonscientific character of astrology."

Miller points out that the results suggest an important agenda for science educational institutions: "Science museums, science TV shows, and other kinds of informal science education should include on their agenda programs to debunk old misunderstandings as well as to provide exposure to new ideas. We have tended not to pay much attention to *mis*understandings of science."

In his final oral remarks at the AAAS Miller added a criticism of newspapers that publish horoscope columns without including a disclaimer, as has been recommended by the Committee for the Scientific Investigation of Claims of the Paranormal. Such publications "contribute some kind of implicit endorsement" and "credibility" to astrology by their association with horoscopes, he said.

—*Kendrick Frazier*

NORC Knocks Gallup Trends Claim

The 1990 Gallup survey of paranormal belief in America was summarized in newspapers nationwide and published in full as a cover Special Report in the SKEPTICAL INQUIRER (Gallup and Newport, Winter 1991). Now Tom W. Smith of the National Opinion Research Center at the University of Chicago says the apparent substantial growth of at least certain paranormal phenomena shown by the poll was "a methodological artifact."

One table in the Gallup poll article compared results of Gallup polls in 1978 and 1990. The table showed large increases in the percent believing in

déjà vu (which, incidentally, isn't even a paranormal phenomenon), devils, and ghosts and small, statistically marginal increases in belief in witches and clairvoyance, plus small declines in belief in ESP and astrology.

Smith, in a paper titled "Phantom Changes on Paranormal Beliefs," made available to the SKEPTICAL INQUIRER, says Gallup compared surveys that differed in several important regards. "The two surveys (1) used different question wordings, (2) asked about different phenomena in different orders, and (3) employed different data collection methods."

The 1978 survey did not offer any equivocal or uncertain response options, while the 1990 one did. This would tend to systematically reduce belief in 1990 compared with 1978 when reported as Gallup did in its "trends table," Smith says.

The question wordings themselves were also frequently notably different across the two surveys, Smith points out. The 1990 survey gave more elaborate definitions of the phenomena in question. Smith says this "should have increased reporting." For example, what in the earlier survey had been labeled merely "ghosts" was expanded to include "spirits of dead people" in the 1990 survey. "It probably moved images from those of Halloween and Hollywood to more general thoughts of spiritual entities," Smith says.

"In trying to assess the changes in wording, we believe that there was probably no alteration for witches, trivial changes for ESP and astrology, and substantial shifts for déjà vu, ghosts, clairvoyance, and devils. We believe that the changes for déjà vu, ghosts, and devils expanded or changed the term so that it was notably easier to believe in the amended items than the original formulations. . . . If these assessments are correct, all the major gainers from 1978 to 1990 (Déjà vu, Ghosts, and Devils) may be the result of wording changes."

He also says that the 1978 survey was done in person and the 1990 survey over the phone. This could have affected results in several ways.

"In sum," says Smith, "the 1978 and 1990 Gallup surveys differ in a multitude of ways. Any rigorous comparison between these surveys is impossible and they should not be used to study changes in beliefs about paranormal phenomena. As a result, despite Gallup's claims, there is no evidence that belief in the paranormal has increased over the last decade."

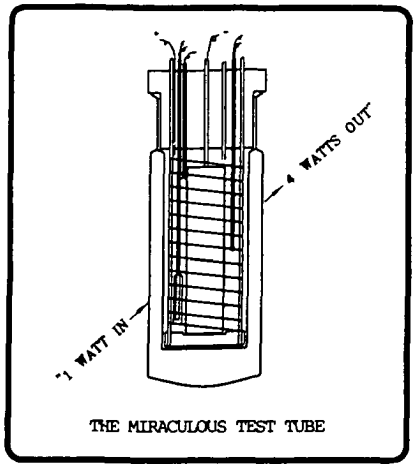
SI gave survey authors George Gallup, Jr., and Frank Newport several opportunities to reply to Smith's criticisms, but they have not done so.

—*K.F.*

A Chemist on Cold Fusion

To the two books on cold fusion, one by Frank Close and the other by Eugene F. Mallove, reviewed in recent issues of *SI*, we can now add a third. It is the first by a chemist. John R. Huizenga, of the Department of Chemistry at the University of Rochester, has written *Cold Fusion: The Scientific Fiasco of the Century*, published in March by the University of Rochester Press.

Huizenga was co-chairman of the Department of Energy (DOE) panel on cold fusion, assembled to advise the Secretary of Energy on the extraordinary claims of an energy utopia based on experiments using essentially test-tube chemistry. The DOE



Schematic drawing of the experiment conducted by Pons and Fleischmann, showing the power-gain claimed at their press conference. From the cover of Huizenga's *Cold Fusion: The Scientific Fiasco of the Century.*

also instructed its ten large national laboratories to divert some of their resources to conducting their own cold-fusion experiments in attempts to replicate the claimed phenomena. It asked them to report the results, positive or negative, to DOE headquarters weekly. Based on all this evidence, the advisory panel eventually gave cold fusion a markedly cool appraisal.

Huizenga gave an invited topical lecture "Cold Fusion Unmasking" at the AAAS meeting in Chicago in February (in a session on ethics and research policies), and it amounted to a preview of his book.

Here is Huizenga's concise summary of the cold-fusion episode, as he sees it:

"The chimera of cold fusion with excess heat is a striking illustration of what happens when research is done in isolation by scientists who are outside their field of expertise, when scientists circumvent the normal peer review process, when scientists require too many surprises to account for their results, when scientists distort the normal scientific procedures to protect their patent rights, and when scientists use the press as a conduit to disseminate information about a claimed discovery in an unrealistic and overly optimistic tone."

But the incident did reveal the scientific process in action. Huizenga's paper concludes on this positive note: "Scientists are real people and errors and mistakes do occur in science. . . . In the end the scientific method can be relied upon to sort out the valid experimental results from background noise and error. . . . The cold fusion fiasco illustrates once again, as N rays and polywater have done earlier, that the scientific process works by exposing and correcting its own errors."

—*K.F.*

Subliminal Tapes: Controlled Tests (With Bogus Tapes)

Recent months have been difficult times for manufacturers of *subliminal self-help tapes* and the nearly $50-million sales market they control each year. As SKEPTICAL INQUIRER readers were informed in the Spring 1992 issue, a number of controlled experiments have been performed to test the effectiveness of these products. The results do not substantiate the often outrageous claims being made by the manufacturers, but instead demonstrate a lack of empirical support for the efficacy of their products.

In response to some of this "negative" research, which has received national public exposure, Effective

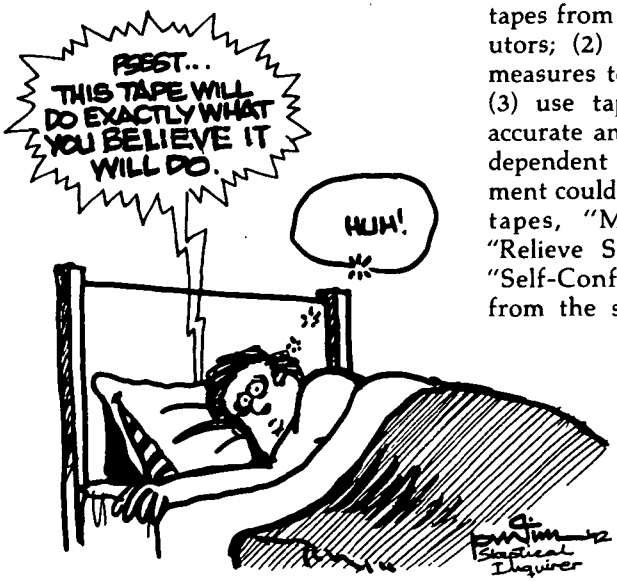
Learning Systems, Inc., has published a notice to their customers in their "Success Catalog," which is an advertisement for their self-help "Love Tapes." The notice begins: "Should I Buy Subliminal or Regular Love Tapes?" Notice that the option of not buying anything, for lack of empirical support of their usefulness, is not suggested as an alternative. It continues, "Let us help you decide." Then to build the case that subliminal products work: "There have been dozens of subliminal communication studies by . . ." and they name Silverman, Becker, Taylor, and Parker, without any mention of the failure over the years to replicate this research; nor do they mention the lack of adequate controls in these studies.

The ad emphatically points out that "not all subliminal tapes are equal!" and says the studies that fail to substantiate the effectiveness of these products "totally failed to consider the effectiveness of tapes that combine audible plus subliminal programs," which, of course, is present in *their* tapes. Since the ad doesn't tell us which of the publicized reports they are criticizing, it is difficult to evaluate the truthfulness of this statement.

This ad, so typical of the self-help industry, ends with shallow advice: "But don't take our word for it, or anyone else's. See for yourself." In other words, forget about all that talk of evidence, and buy our product.

Now the subliminal market has been dealt another blow. Research presented at the most recent Western Psychological Association meeting in San Francisco and conducted by Bryan Auday, Jennifer Mellett, and Philip Williams, all from Gordon College (Wenham, Massachusetts) found no evidence that subjects benefitted from the subliminal contents of the tapes they listened to. The paper "Self-improvement Using Subliminal Self-help Audiotapes: Consumer Benefit or Consumer Fraud?" describes a series of three experiments in which subjects were randomly assigned to a group that listened to a genuine subliminal tape or a control group that listened to a bogus tape with no subliminal content.

Auday and his colleagues had three goals in mind: (1) empirically test the most frequently ordered subliminal tapes from one of the largest distributors; (2) employ adequate control measures to rule out placebo effects; (3) use tapes that allowed for an accurate and valid assessment of the dependent variables so that improvement could be fairly evaluated. Three tapes, "Memory Improvement," "Relieve Stress and Anxiety," and "Self-Confidence (Self-Image)," all from the same manufacturer, were tested. A total of 103 subjects were pretested using widely accepted tests for each of the dependent variables (e.g., stress and anxiety were assessed using the Anxiety Scale Questionnaire



Isaac Asimov

Isaac Asimov, perhaps the greatest explainer and popularizer of science of all time, died April 6 at the age of 72. He was also a towering figure of twentieth-century science fiction, author of works that had been voted the best science-fiction series (*Foundation* Trilogy) and best science-fiction short story (*Nightfall*) of all time.

He combined extraordinary gifts of intellect, curiosity, imagination, and clarity of thought and expression with an astonishing passion for writing that produced nearly 500 published books (335 of them still in print). They range over every field of science, as well as most other areas of human knowledge, including history, Shakespeare, and the Bible. Few writers have ever produced a body of work of such substance, magnitude, breadth, and diversity.

Photo by Alex Gotfryd

He was a relentless defender of reason, rationality, and the values of science. He was a founding Fellow of CSICOP and had been a SKEPTICAL INQUIRER consulting editor since 1978.

The SKEPTICAL INQUIRER plans to publish a series of tributes by friends and colleagues in a future issue.

—*Kendrick Frazier*

and the Jackson Personality Inventory). Subjects did not know whether they had received a genuine tape or a bogus tape. The manufacturer's recommendation of 3 to 4 weeks of listening to the products was followed. At the end of this period subjects were post-tested with the same instruments used during the pretesting.

Results using analysis of variance revealed no significant improvements, for any of the dependent variables, that could be attributed to the subliminal contents of the tape. In terms of empirical support for the effectiveness of subliminal self-help tapes—the evidence just does not appear to be there.

—*Bryan C. Auday*

Bryan Auday is an associate professor of psychology at Gordon College, Wenham, Massachusetts.

James Michener's Tales of a Fortune-Teller

The author James A. Michener's memoirs, *The World Is My Home*, published early this year by Random House, are filled with unforgettable stories of his travels and his experiences as an involved citizen and a writer of epic novels that have entertained and informed millions worldwide (*Tales of the South Pacific, Hawaii, Caravans, The Source, Centennial, The Covenant, Space, Poland, Texas, Caribbean*, to name just a few).

Every chapter yields pleasures and surprises. But to the skeptic nothing could be more unexpected than this: Late in the book Michener, who turned 85 on February 3, devotes the

first third of a chapter (pp. 403-411) to his experiences learning, and practicing, the art of fortune-telling. Yes, fortune-telling.

Once when "knocking about Egypt" Michener came upon a gifted fortune-teller named the Princess. His interest and curiosity led her to let him in on her system. She used a deck of cards to provide the fortune, arranged in six columns of eight with four cards left over, "the heart of the fortune."

She would put on remarkable exhibitions based on what Michener realized was "insight, shrewd guessing, and plain common sense," and her readings were often right on the mark. She told him not to try to be clever; use any secret information your subject reveals but stick with what the cards reveal. And she pointed out that all people are vitally concerned with the six headings, which dealt with job, love, safety, death, money, and travel. And she told him always to be specific; when you're correct it has a big impact on the subject.

Some years later his home district in Pennsylvania decided to launch an arts festival, and a friend urged Michener to tell fortunes as his contribution. He set up a tent, put on "an outrageous hat and scarf" and "began to tell some of the wildest fortunes ever heard in rural Pennsylvania." His fortune-telling became a sensation, "and by sheer accident I hit just enough truths or near-truths to cause neighbors to tell others of the remarkable record I was compiling as a man who could really foresee past and future."

It was then he uncovered the real secret that the Princess had kept from him, Michener recalls. "In the course of telling a fortune the seer makes about forty-five separate statements, and at least thirty-five will be totally wide of the mark, but if he or she succeeds in the remaining ten to hit even one right on the nose, that is what is remembered. . . ."

A string of just such lucky hits—and Michener gives several examples—established his reputation and began attracting clients from outside the area.

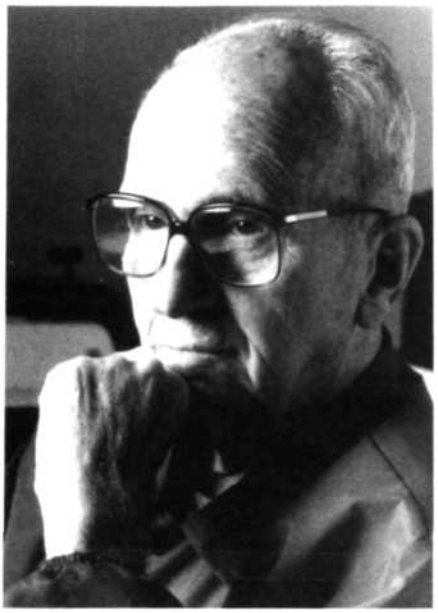
He then came to another realization. "I discovered that one of the profound secrets of fortune-telling is that subjects want to believe what they are being told and will sometimes go to extreme lengths to make the prophecies come true." He told a businessman he would go to Omaha the next Tuesday and things would work out well. He later found the man as a result had added Omaha to a trip originally intended to include only Kansas City, and in Omaha had indeed engineered a successful deal. "That fellow Michener is unbelievable," the man told everyone. "My reputation grew," Michener says.

Michener stopped the readings only when he realized how seriously people were beginning to take them. He told a woman and her husband not to go on a planned trip. She later told him they went, and their car was hit by a truck and her husband was killed.

"This, and other extraordinary coincidences that resulted from sheer guessing, began to make me think that what I was doing was irresponsible; it had become far more serious than just a silly game, and I realized that I had better quit the nonsense, because even if I refused to take it seriously, others did."

He says the fortune-telling methods he was taught bear a "striking resemblance" to the story-telling skills he uses in novels. "In both activities one used observation, shrewd guesswork, and the proper selection of emotion-laden words to create empathy."

Michener concludes this tale in a way that will endear him to skeptics.



James Michener learned, practiced, and then revealed the secrets of fortune-telling. (Photo ©1991 Steven Pumphrey.)

"Never once, not even when I was reaping great acclaim as a seer, did I believe a word of what I told my subjects, nor did the Princess. . . . Each of us acknowledged that what we did was nothing but delightful trickery."

He resisted entreaties to enlist in the cause of believers. "I was frequently invited or badgered to confess that I had supernatural powers, or was in touch with spirits, or had at some point been inducted into the world of black magic, but I was never remotely inclined to accept such nonsense and quickly dropped my involvement when others began to take fortune-telling more seriously than I did. I had no powers of spiritualism whatsoever. Tarot, I Ching, and astrology disgust me, and I think that newspapers that publish daily horoscopes are enemies of sanity. When people ask 'What sign are you?' I cringe."

SI readers should also find two other parts of Michener's memoirs of special interest. One is his brief description (pp. 270-271) of the sad events at Macmillan, where he worked as an editor, when a fellow editor, Jim Putnam, a hero of Michener's, got into serious trouble for persuading Macmillan to publish Immanuel Velikovsky's *Worlds in Collision*. The book was on its way to becoming a bestseller, but the community of scientific scholars "descended on Macmillan in outrage," Putnam was fired, and the book was given to another publisher. Michener never saw Putnam again. He treats this as a case of censorship.

The other (pp. 492-494) concerns the Russian scientist Trofim Lysenko. Lysenko's theories briefly held deep appeal to Michener, an orphan of uncertain parentage, because they gave him hope that "acquired characteristics" resulting from his upbringing and strength of character overwhelmingly outstripped the importance of Mendelian genetic inheritance. Nevertheless when evidence discrediting Lysenko began to mount, Michener accepted that and revised his thinking accordingly.

—*Kendrick Frazier*

Study of Pathological Science in China

Enthusiasm for studying the phenomenon of "pathological science" has recently been aroused among Chinese scientists and philosophers. They feel it could be used to counter "paranormal science" in China, since it has been regarded as an important concept in the West.

The first person to introduce this concept into China was physicist Qin Cheng-Rui, wife of the distinguished physicist He Zuo-Xiu. Her article "Pathological Science, Cold Fusion, etc." was published in *Research into Nature Dialectics* (no. 1, 1991). In this article, Qin described pathological science as a social activity in which scientists are influenced by strong wishful thinking resulting from popular social ideas.

In another periodical, *World Science*, the article "Pathological Science," by Irving Langmuir, was translated and published in June 1991. (It had been published earlier in the United States in the October 1989 *Physics Today*.) Then the article "Cold Fusion, Qi-gong Craze and Pathological Science," written by Wu Xiang-Hong, was used in *Knowledge Is Power* in January 1992.

In fact, paranormal beliefs are so popular in contemporary China that they have been called "crazes." The most essential cause is that many Chinese have hardly developed their skill of thinking scientifically. Chinese are highly proud of their long history and traditional culture, and such an attitude is encouraged by the government. This pride itself is harmless, but it could be dangerous when the scientific spirit is discarded or disregarded. Some scientists and VIPs believe that they can revolutionize the field by studying such "treasures of traditional culture" as Qi-Gong, and in some cases are cheated by their own wish. Therefore, it would appear to be a good idea for these people to be introduced to the study of pathological science.

Wu Xiang-Hong

Wu Xiang-Hong is a graduate student at the People's University of China, Beijing.

China Acts to Suppress Fortune-Tellers

In a move sure to strike many with mixed emotions, the Communist government of the People's Republic of China recently banned 25 publications dealing with fortune-telling and related subjects.

The Press and Publications Administration of the PRC announced that the move was made "to increase their vigilance and absolutely to not allow this kind of publication to harm society and poison people's thoughts" (*sic*), in a statement made in the official *People's Daily*.

Many of the publications are quite ancient and are considered to play a significant role in the history of Chinese culture, among them being the *I Ching*, or *Book of Changes*, a fortune-telling system that is considered to be the oldest book in the world and is still very popular today among the Chinese.

Other works banned deal with such subjects as choosing names that will ensure good fortune, judging character by a person's outward appearance and facial features, and other fortune-telling methods. Publishers will receive fines and unspecified administrative punishments.

It is doubtful if this action will have much long-term effect on the beliefs of the average Chinese citizen or the attitudes toward these beliefs in Chinese society in general. Many of these beliefs have survived for thousands of years. They have flourished under conquests by Mongols and Manchus and persevered through the trials and tribulations of both capitalist and communist reforms and dramatic cultural and lifestyle changes, including the horrors of the Cultural Revolution, during which traditional

Chinese culture was widely suppressed. Furthermore, there is a great deal of evidence that at this time the typical Chinese citizen has more faith in traditional Chinese fortune-telling systems than in the pronouncements of the government.

—*Peter Huston*

Peter Huston writes from Taipei, Taiwan.

A Laurel to JAMA *For it's Maharishi Ayur-Veda Exposé*

The *Columbia Journalism Review* has given a coveted "Laurel" in its "Darts and Laurels" column to the *Journal of the American Medical Association* and its associate editor Andrew Skolnick for the investigation of deceptions involving Transcendental Meditation's Maharishi Ayur-Veda health-care products and services. The complex of events during which *JAMA* first published a favorable article about Ayur-Veda and then found it had been deceived about the authors' connections to the movement were the subject of a lengthy investigation by Skolnick. This was published by *JAMA* and later described in Skolnick's special report in the Spring 1992 SKEPTICAL INQUIRER.

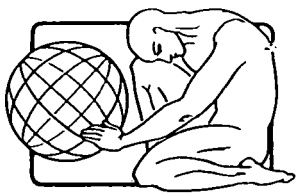
CJR credited *JAMA* for "a fine piece of corrective surgery after a botched operation." Finding that Maharishi Ayur-Veda actually referred not to an ancient healing system of India but to a trademarked line of products and services introduced in 1985, and further that the "three impressively credentialed authors had a strong interest in the marketing and promotion of the TM stuff," says the journalism review in its March-April issue, "*JAMA* took heroic measures to resuscitate its reputation." Following Skolnick's three-month probe, "*JAMA* exposed far more than the numerous consultancies, research grants, directorships, stock ownerships, and other ties to the entrepreneurial yogi's multimillion-dollar business that the authors had somehow forgotten to mention: Skolnick found what appeared to be a widespread pattern of misinformation, deception, and manipulation of . . . news media. . . . As a result of Skolnick's investigation, TM's health-care business is now being examined by the National Institutes of Health, a congressional subcommittee, and the FDA."

Several pages of letters to the editor about the affair, followed by a two-column reply by Skolnick, appear in the March 11, 1992, *JAMA*.

—*K.F.*

A Skeptics Society in Los Angeles

There is a new skeptics group in the sprawling and populous Los Angeles metropolitan area. Called the Skeptics Society, it has been



New group's logo.

organized to promote critical thinking and encourage scientific investigation of paranormal and pseudoscientific claims.

The Skeptics Society is directed by Michael Shermer, who has a doctorate in the history and philosophy of science and teaches and does research at the Institute for Human Progress. Like other local groups, it is independent and autonomous, but shares some intellectual goals with CSICOP.

Shermer is author of *Teach Your Child Science* and *Teach Your Child Math* (co-authored by Arthur Benjamin), both recently published by Lowell House, (Los Angeles). "I am interested in exploring the role of science and skepticism in all areas of the human condition," says Shermer in announcing the new group.

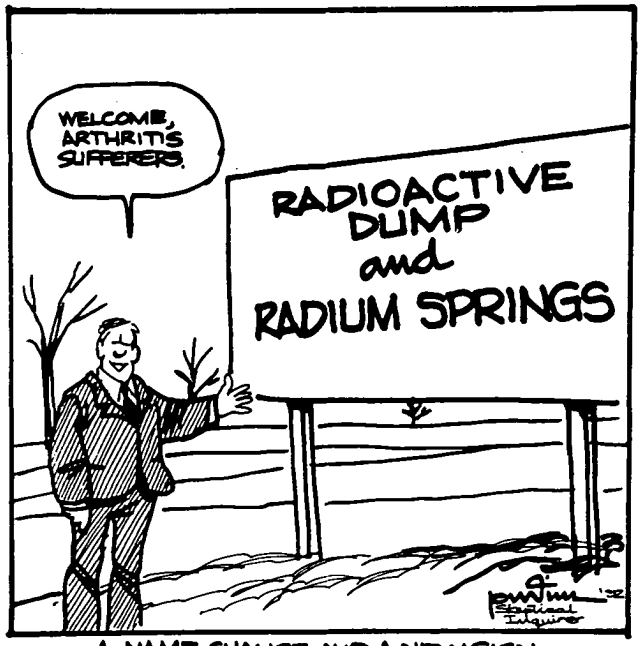
The Skeptics Society will host a monthly lecture series on the campus of the California Institute of Technology. It's first speaker, on March 22, was James Randi. Shermer said more than 400 people attended.

For further information contact the Skeptics Society at 2761 N. Marengo Ave., Altadena, CA 91001, phone/fax 818-794-3119.

—*K.F.*

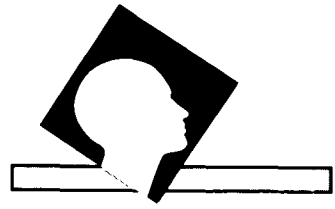
Funny Stuff

How many times have fellow skeptics shaken their heads sadly when finding astrology, occult, and paranormal books classified with "Science," "Philosophy," or some other respectable field of inquiry? Philosophy professor William Grey says Grahames' Bookshop in Wollongong, Australia, deserves commendation. It includes the classification: "Humour/Astrology." □



A NAME CHANGE AND A NEW SIGN ARE BEING PLANNED.

Notes of a Fringe-Watcher



MARTIN GARDNER

☐ *The Big Bang Theory Still Lives*

A few years ago astronomers discovered that the universe is much lumpier than they had supposed. Galaxies are not spread uniformly throughout space. They tend to cluster along the imaginary surfaces of enormous bubbles that surround monstrous voids, or along huge ribbons that twist through space. This lumpiness seems to contradict the uniform distribution of the microwave radiation believed to be the residual glow from a primordial fireball. If the universe is so clumpy, why is this background radiation so incredibly smooth?

Spurred on by a small group of scientists, the media have seized on these newly found large-scale structures as evidence that the big bang (BB) theory is mortally wounded. *Time* (September 2, 1991) headed a page "Big Bang Under Fire." Dozens of reports on the BB's demise have appeared in newspapers and such periodicals as *The Sciences* (January/February, 1990) and England's *Nature* (August 10, 1989). Plasma physicist Eric J. Lerner has even written a book titled *The Big Bang Never Happened* (Times Books, 1991), which has been widely and favorably reviewed.

One might think that all conservative Christians would welcome BB theory. Because no one has any clear idea of how a "quantum fluctuation" can occur all by itself in nothing, the BB offers a convenient moment for a Creator to start the process of cosmic evolution. (Of course empty space is not pure nothing; it has to contain quantum fields capable of fluctuating.) Indeed, many liberal Christians and philosophical theists have viewed the BB in this light. But among fundamentalists still clinging to the notion that God created the universe some ten thousand years ago, the BB is anathema. To accept it would require accepting an evolving cosmos billions of years old. Creationists are now all in a dither over prospects that the BB may be overturned. It only shows, they say, how shaky modern science is—maybe, just maybe, evidence for a young earth will soon be forthcoming.

It will not be forthcoming. Although BB theory may have to be modified, or even replaced by a new model, evidence that the universe is billions of years old is overwhelming. Not only that, but rumors of the BB's death are enormously exaggerated.

The term *big bang* was coined by British astronomer Fred Hoyle to poke fun at the BB conjecture of physicist George Gamow. At that time Hoyle favored an expanding steady-state model with no beginning and no end. To keep the infinite universe always in the same overall state while it

balloons, new matter is constantly being created in the form of hydrogen atoms—though where those atoms come from was never explained. Hoyle's theory met its death when the cosmic background radiation was detected.

At the moment, the BB's chief rival is a theory proposed 20 years ago by Hannes Alfvén, a Swedish physicist and holder of a 1970 Nobel Prize, now 84 years old. Alfvén has a reputation

as a maverick whose proposals have been a mix of successful hits and unfortunate misses. One of his controversial conjectures was the basis for his *Worlds–Antiworlds* (Freeman, 1966). The book defended the view that half the galaxies in the universe contain stars made of matter and that the other half contain stars made of antimatter. Almost all astrophysicists now agree that the universe is entirely matter.

In Alfvén's model, gravity is not alone in shaping galaxies. They are formed mainly by the electromagnetism of titanic helical vortices in plasma, an ionized (electrically charged) gas, often called a "fourth state of matter," that permeates the universe. Indeed, 99 percent of the universe is plasma. Suns are made of plasma. Their winds are plasma. Plasma surrounds the larger planets, including Earth. It is plasma that produces the polar auroral lights. Fluorescent lights contain a form of plasma.

Only a few plasma physicists favor Alfvén's view that plasma shapes the galaxies. If gravity was acting alone, they maintain, the large-scale galactic clumping would have required at least a hundred billion years, far exceeding the amount of time permitted by BB theory. The plasma theory, they say, not only allows sufficient time for clumping, it also predicted just such clumping.

Although Alfvén's universe is infinite in time and space, it is not a steady-state model like some of its rivals. Drawing on the views of Belgian chemist Ilya Prigogine, it is a universe that began in chaos and is steadily evolving more and more complex forms of order. At the beginning was a uniform hydrogen plasma that had always existed. Over trillions of years it began to develop vortices and gravitational instabilities that finally, after hundreds more billions of years, formed galaxies, stars, and planets. Unlike the BB model, Alfvén's universe is not running down as its entropy increases, but is being continually wound up in ways that Prigogine seeks to explain. Its future is unlimited and unpredictable.

Now, the greatest obstacles to this infinitely evolving cosmos are the red shifts of distant galaxies, which are best explained by a uniformly expanding, finite model. If you run the expansion backward, you reach a time, 10 to 20 billion years ago, when the universe had to be an infinitely dense

Big Bang Gets Big Boost

As this issue was on it's way to press, the startling news broke that NASA's Cosmic Background Explorer (COBE), peering back some 15 billion years into the past, found that the microwave radiation was far from uniform. Fluctuations in the radiation showed that soon after the big bang there were nonuniform patterns in the radio waves sufficient to account for a rapid congealing of primeval gas into large-scale structures.

The discovery was hailed as the most important in cosmology for the past two decades. "If you're religious, it's like looking at God," said George Smoot, an astrophysicist at the University of California, Berkeley, who led the research team. "The big bang," exclaimed astrophysicist Edward Wright, a member of Smoot's team, "is alive and well, very well!"

Still a mystery is the nature of the "dark matter" required by big-bang theory to account for the galactic structure. As I write, there is yet no word from Alfvén or Lerner about their reaction to the news. My guess is they are not likely to toss in their towels, but will be proposing an explanation for the COBE results that is consistent with their plasma model.

—*M.G.*

singularity that exploded.

How does Alfvén evade this evidence? His conjecture is that the primeval plasma first produced a thin mixture of matter and antimatter that gathered into huge clouds. Gravity caused each cloud to start to collapse until the collisions of matter and antimatter produced an explosion that covered a space hundreds of millions of light-years across and lasted millions of years. Portions of each original cloud blew apart to form smaller clouds of matter and antimatter that in turn exploded in myriads of smaller bangs. Alfvén calls this his "fireworks model."

We live in what Alfvén calls a "metagalaxy." It arose from a little bang that occurred 10 to 20 billion years ago, as indicated by the red shifts. In infinite space an infinity of other metagalaxies are forming. Half our galaxies are made of matter; the other half, of antimatter. Stars are so far apart that when galaxies of opposite matter collide, they pass through one another without mutual annihilation. The microwave background comes not from the BB of a singularity. It is radiation from nearby stars, smoothed by intergalactic plasma.

Eric Lerner acknowledges that there are grave difficulties with this scenario, even though he is certain that BB theory has been refuted by the universe's large-scale structures and that something like Alfvén's model will have to be substituted. Another alternative to BB cosmology is the possibility that red shifts are not measures of receding velocities, but the result of other, as-yet-unknown causes. If this is true, then of course our metagalaxy is not expanding at all. Few cosmologists believe that any other explanation of red shifting will be found, or that there is any evidence to support Alfvén's fireworks.

Lerner's battering of the BB theory would be more effective if he would soften his rhetoric, which is like that

so often used to support fringe science. Not content with giving data and arguments against the BB, and sketching alternative models, Lerner bashes the scientific establishment for its stubborn inability to accept new ideas. If BB theory is discredited, he warns, would not the careers of hundreds of researchers be threatened?

Although evidence against the BB remains far from persuasive, Lerner's enthusiasm is boundless. He likens the coming rejection of BB theory to the Copernican revolution. Just as astronomers tried vainly to patch up the Ptolemaic model with mystical epicycles, so (Lerner claims) BB buffs keep patching their dying model with such "epicycles" as a sudden inflation of the universe immediately after the BB, mammoth cosmic strings to sculpt the galaxies, yet undiscovered "dark matter" to keep whirling galaxies intact, black holes, gut theories, superstrings, and other improbable ad-hoc devices.

Lerner correctly perceives that if certain popular versions of the BB go, a drastic revision of modern particle physics will be needed, perhaps even a refinement of quantum mechanics. This is a tall order, especially since Lerner has nothing to offer in the way of a better theory of particles.

The most surprising aspect of Lerner's book is his plunge into a dubious sociology of science. He actually believes that the BB's popularity rests not on sound evidence but on an obsession with a free-market economy that allows the rich to get richer and the poor to get poorer. He thinks the dream of working for a brighter future has been forgotten as greed takes over. Along with the greed comes a pessimism about the future of humanity, which in turn generates a pessimism about the future of the universe. He subscribes to the view that if our universe is destined to die from an overdose of entropy, or from a big crunch at the end of a contracting phase, then the universe does seem, as in a much-quoted passage from a book by Steven Weinberg, to be "pointless."

Presumably, if we could only get rid of unfettered capitalism and substitute a more humane democracy, economic woes would be diminished, hope for humanity's future would revive, and scientists would replace the pessimistic BB theory with an optimistic plasma model. The dying universe of BB theory would give way to a universe in which humanity would flourish forever, evolving into higher and higher forms of intelligence as it colonizes the stars. It is hard to believe, but Lerner goes out of his way to point out that Alan Guth developed his inflationary model of the BB at the very time that our nation was experiencing its worst monetary inflation of the century!

Here is a sample of Lerner's sociological speculations:

> Obviously, the small-scale speculators of cosmology did not, in any conscious way, imitate the large-scale speculators of Wall Street. Yet, as in every other epoch, society's dominant ideas permeated cosmology. If the wealthiest members of society earned billions by mere manipulation of numbers, without building a single factory or mill, it didn't seem too strange that scientific reputations could be made with theories that have no more relation to reality. If a tower of financial speculation could be built on debt—the promise of future payment—then, similarly, a tower of cosmological speculation could be built on promises of future experimental confirmation.

Because science is always corrigible, there is indeed a possibility

that as more evidence accumulates the BB model will blow up with a bang, or fade slowly with whimpers, or what seems most likely at the moment, be steadily refined. It is true that astronomers change their models of the universe about every 50 years. As someone has said, cosmologists are always wrong but seldom uncertain.

Unfortunately, the dogmatism of big-bangers is exceeded by the dogmatism of their detractors. "The Big Bang is a myth," Alfvén has declared, "a wonderful myth maybe, which deserves a place of honor in the columbarium which already contains the Indian myth of a cyclic universe, the Chinese cosmic egg, the Biblical myth of creation in six days, the Ptolemaic cosmological myth, and many others." Writing in *Sky and Telescope* (February 1992), Lerner likens BB theory to the emperor's nonexistent clothes.

Lerner seems to think that we mortals, knowing we will soon die, are less concerned about our own fate than about the fate of our universe hundreds of billions of years from now! Here is his book's stirring next-to-last paragraph:

> Do we live in a finite universe doomed to decay, where humans are insignificant transitory specks on a tiny planet? Or are we instead the furthest advance of an infinite progress in a universe that has neither beginning nor end? Will our actions today have no meaning in the end of all things, and are we now being swept into that inevitable decay? Or does what we do here and now permanently change the cosmos, a change that will echo through a limitless future?

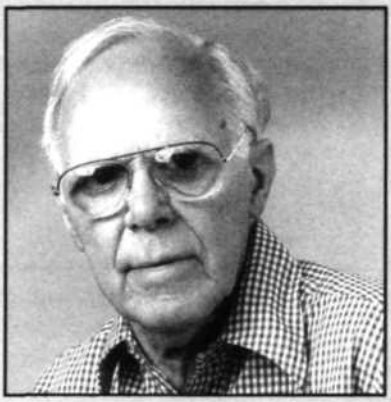
If Lerner's sociology is right, we may have to get rid of capitalist greed before our scientists will open their minds to Alfvén's optimistic cosmology. Lerner is confident that as new evidence against the BB is forthcoming, the pendulum will start swinging the other way and cosmologists will abandon armchair theorizing for a model based more firmly on hard empirical data. It is not clear whether he thinks such a change in cosmology will help eliminate economic greed, or whether the greed will have to go before the cosmology changes.

Although the BB is still favored by the vast majority of cosmologists, who knows what big surprises our new telescopes and particle accelerators have in store? We must wait and see.

(See also Victor Stenger's review of Eric Lerner's book, this issue.—ED.)

Martin Gardner's latest book, On the Wild Side *(Prometheus, 1992), includes his 16 most recent columns from the* SKEPTICAL INQUIRER, *with addenda, and 16 essays and reviews published in the* New York Review of Books, Free Inquiry, *and other periodicals.*

You Can Help Build the Center for Inquiry



Martin Gardner and Steve Allen co-chair the Center for Inquiry fund-raising campaign.

Science commentator Martin Gardner and author-humorist Steve Allen, co-chairs of the Center for Inquiry Capital Fund Drive, will lead an expanding fund-raising effort, now under way. Its aim is not only to raise the funds required to complete Phase II of CSICOP's headquarters, but also to create an Endowment Fund whose income can be used in part to defray operating and maintenance costs of the new headquarters in perpetuity and to enrich all our programs.

Martin Gardner, the author of numerous books, wrote the long-running "Mathematical Games" column in *Scientific American* for many years and is a longtime contributor to *SI*.

Steve Allen is an author, humorist, musician, and television personality who created public television's *Meeting of Minds* series. His recent book *Dumbth: And 81 Ways to Make Americans Smarter* focused on America's crisis in critical thinking.

In 1991, CSICOP and the SKEPTICAL INQUIRER moved many of its offices and production facilities to a new 5,700-square-foot building near the State University of New York at Buffalo/Amherst campus. By conducting this Phase I project in cooperation with the Council for Democratic and Secular Humanism (CODESH), publisher of *Free Inquiry* magazine, and thanks to the generosity of our readers, CSICOP was able to pay almost all of its share of the costs.

Phase I was never designed to house back-issue storage, our mail center, and audio-visual facilities—most of which remains seven miles away in a decaying urban neighborhood. Moreover, our new headquarters has space for only the most recent literature in CSICOP's library collection. Finally, it provides no room for our increasing number of meetings and seminars.

Completing the 25,000-square-foot Phase II will consolidate all our Buffalo-area operations at one site—and provide permanent space for CSICOP's much-needed research library, seminar-meeting rooms, and additional office space. In addition, there will be room for expansion as CSICOP continues to grow.

It's Up To You

Your contribution at this time will help us to maintain our momentum as we accumulate funds for the design and construction of Phase II. Donors of $1,000 or more will be listed in a special commemorative album. Names of donors of $5,000 or more will be inscribed on a bronze plaque. A seminar room in the Phase II building will be named after anyone giving $25,000 or more, and a wing of the building will be named for anyone giving $100,000 or more. Gifts may be paid through three-year pledges payable quarterly, or with stocks or bonds.

Please make your contribution today. Make checks payable to CSICOP and mail to the CSICOP/Center for Inquiry Capital Fund Drive, Box 703, Buffalo, New York 14226-0703. Inquiries regarding substantial gifts, phased pledges, or bequests may be made in confidence to Paul Kurtz at the same address.

— —

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Psychic Vibrations

Smart Drinks, Orvotron Activation, & Vedic Science

ROBERT SHEAFFER

Now that increasing health-consciousness is making alcohol less glamorous, what *are* people supposed to drink during a night out on the town? "Smart drinks," claimed to give your mental and physical powers a temporary boost, are the surprising choice of many active young adults at trendy California night spots. As described in the January 31, 1992, *San Jose Mercury News*, these drinks—sporting names like "Blast" and "Wow" and selling for about $4.00—contain megadoses of vitamins or amino acids. Many of them contain high doses of either choline or phenylalanine, which are supposed to help the brain build up its neurotransmitters and thereby increase mental powers. None of these substances are illegal (although many revelers spike their smart drinks with drugs like LSD), and no laws are broken so long as these supposedly smart ingredients are marketed as "nutritional supplements" rather than as "drugs."

Most of the smart drink formulas on the market today come from the fertile minds of Durk Pearson and Sandy Shaw, authors of the best-selling book *Life Extension: A Practical Scientific Approach*. Their success in amplifying human intelligence probably matches their ability to extend human life. Smart drinks have now become big business, and one of the leading amino-acid entrepreneurs is the former 1960s radical Jerry Rubin, now a distributor of something called Omnitrition International. Rubin claims to have 10,000 "individual entrepreneurs" working under him. The absence of scientific proof that these drinks have any real effect on one's mental powers seems to have had no adverse effect on their sales.

Users of smart drinks perceive many benefits from their use. People make such claims as "I can stay really focused for longer periods of time" and "The drinks keep you going when you are

feeling a little slow." But James McGaugh, a neurobiologist at the University of California at Irvine who specializes in the study of brain chemistry, charges that these so-called smart drinks are quite useless and that widely publicized claims about "smart drugs" are both irresponsible and potentially dangerous. On the other hand, Mark Rennie, attorney and evangelist for the smart drink crowd, gushes: "This is *huge, huge, huge.* This is the next evolutionary shift on the planet. . . . Once this thing hits a critical mass, I think the government will panic." Still, nutritionist Bonnie Liebman of the Center for Science in the Public Interest notes: "Pearson and Shaw have made outrageous, unsupported claims in the past. . . . If anyone's smart, it's the people who have developed this whole scheme."

* * *

In matters eschatological, 1991 was a bust. The Gulf War ended without triggering Armageddon, which many fundamentalists had confidently expected. Disciples of the ultra-orthodox Lubavitcher sect, based in New York City, were no doubt keenly disappointed when the Jewish New Year came and went without the revelation of the Messiah, who many expected to turn out to be their 90-year-old leader Menachem Schneerson (this column, Fall 1991: 32). Worse yet, their obscure sect was indeed thrust into national headlines, but by a tragic traffic accident that kindled animosities and divided a community. And even a predicted return of Elvis failed to materialize. Promoter Bill Smith, who produced the hit record "Hey Paula" back in 1963, claims that Elvis phones him up regularly and that they meet from time to time. Presley, he says, has slimmed down to about 190 pounds and now looks "very trim." Smith confidently predicted that 1991 would be the year of "the complete comeback of Elvis Presley."

* * *

Nonetheless, 1992 may yet usher in the golden New Era. Jose Arguelles, who dreamed up the Harmonic Convergence, claims that the ancient Mayans were actually space aliens from the Galactic Federation, and he has fixed 1992 as the year that they're coming back.

A New Age sect called Orvotron, "The East Coast Power Point," has been proclaiming 1992 as the year of the "opening of the Doorway for Ascension," which according to Kortron and Solinus, leaders of the group, is supposed to center around Stone Mountain, Georgia. This was supposed to have culminated in a full "Throne Energy Activation" by this past January 27, so the activation must have taken place silently. Anyone interested in ascending would do well to subscribe to Orvotron's newsletter, which is available for $30 from Solinus. She requests, however, that checks be made out in her Earth name, Judith Wells; perhaps she cannot use her proper star name yet because Orvotron's interstellar bank accounts have not been established.

* * *

As if this were not exciting enough, some UFO believers are circulating claims via various electronic conferences that "the *real* October surprise" will occur on October 12, 1992, the five-hundredth anniversary of Columbus's arrival in the New World. On that day, NASA plans to inaugurate its SETI program—the Search for Extraterrestrial Intelligence—but rumor has it that the ETI may find *us* first. According to one such docu-

ment, "Project SETI has been chosen to be the point organization that will announce to the world a 'discovery'—it will be that they have established communication with an 'alien race' (the lower Greys). The Greys will 'land' at either White Sands in New Mexico, or at Area 51 in Nevada." The very mention of "the Greys" sends a shudder down one's spine in the more paranoid circles of UFOlogy, as this is said to be the alien race that relishes the taste of human flesh.

* * *

This year is also very important because it is "Maharishi's Year of the Constitution of the Universe." If we can believe what we read in the Maharishi's double-page ads in the *Toronto Globe and Mail* of January 30, and who knows where else, "the Source of All Order and Harmony" has been "discovered through Maharishi's Vedic science, verified by modern science." This discovery is explained by sets of tables containing some very complicated symbols. At the top is "Maharishi's Vedic Science," containing what must be Sanskrit letters. Below them, in strict correspondence, we find an equally complicated grouping of symbols from mathematical physics, which for those who have not studied them might as well also be in Sanskrit. The Maharishite explanation goes something like this:

> As with the structure of Ved, the Lagrangian of the superstring can be seen in various degrees of unfoldment. . . . These eight fundamental modes of the string correspond, in Vedic terminology, to the eight

Prakritis—the fundamental qualities of the unified field of consciousness. . . . When these 64 string fields are interpreted with respect to Hilbert space, operators, and states, this gives 3 × 64 = 192 fundamental expressions of Natural Law at this level of description of the Constitution of the Universe—in precise correspondence with the first sukt of the Rik Ved.

Where is all this leading? "We are establishing a Capitol of Heaven on Earth," says Maharishi (although for something as major as Heaven I'd be satisfied with even a mere County Seat). Anyone who wants to learn more about the Constitution of the Universe is urged to contact Maharishi International University; and if you can't find the Maharishi there, you might be able to catch him in Stockholm when he arrives to pick up his Nobel Prize in Physics. □

Psychic Experiences: Psychic Illusions

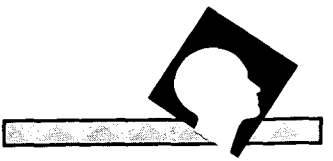
SUSAN BLACKMORE

Why do so many people believe in psychic phenomena? Because they have psychic experiences. And why do they have psychic experiences? Because such experiences are an inevitable consequence of the way we think. I suggest that, like visual illusions, they are the price we pay for a generally very effective relationship with a massively complex world.

The latest Gallup poll (Gallup and Newport 1991) shows that about a third of Americans believe in telepathy and about a quarter claim to have experienced it themselves. Rather fewer have experienced clairvoyance or psychokinesis (PK), but still the numbers are very high and have not been decreasing over the years. Previous surveys have found similar results and also that the most common reason for belief in the paranormal is personal experience (Palmer 1979; Blackmore 1984).

A "psychic experience" is here defined as any experience interpreted by the experient as requiring a psychic or paranormal interpretation. The question of whether such a hypothesis is required is not addressed. Rather we are attempting to understand how such experiences come about even if no genuinely paranormal phenomena occur. It should be noted that many experimental studies of psi (such as guessing long strings of targets) do not produce psychic experiences in this sense, although they may produce evidence of the paranormal. Others (such as ganzfeld studies and remote viewing, perhaps) do, but the experience is a separate issue from the question of statistical significance or evidence for psi. We are here concerned with experience and belief, not the evidence for psi.

My hypothesis is that psychic experiences are comparable to visual illusions. The experience is real enough, but its origin lies in internal



Psychic experiences are the inevitable consequence of the way we think. They are comparable to visual illusions.

processes, not peculiarities in the observable world. Like visual illusions they arise from cognitive processes that are usually appropriate but under certain circumstances give rise to the wrong answer. In other words, they are a price we pay for using efficient heuristics.

In the case of vision, illusions arise when, for example, depth is seen in two-dimensional figures and constancy mechanisms give the answer that would be correct for real depth. The equivalent in the case of psychic experiences may be the illusion that a cause is operating and an explanation is required when in fact none is. In other words, psychic experiences are illusions of causality. I shall discuss five types of illusion.

1. Illusions of Connection

Experiences of telepathy, clairvoyance, and precognition imply a coincidence that is "too good to be just chance." This is so whether the experience involves dreaming about a person's death and that person dies within a few hours, feeling the urge to pick up one's partner from the station and in fact he was stranded and needed help, or betting on a horse that later wins a race.

Some people's response to such events is to say, "That was just a chance coincidence"; while others' is to say, "That cannot be chance." In the latter case the person will then look for a causal explanation for the coincidence. If none can be found, a "cause," such as ESP, may be invoked. Alternatively, some kind of noncausal but meaningful connection may be sought, such as Jung's "acausal connecting principle" (Jung 1973).

There are two possible types of error that may be made here. First, people may treat connected events as chance coincidences, thereby missing real connections between events and failing to look for explanations. Second, they may treat chance events as connected and seek for explanations where none is required. In the real world of inadequate information and complex interactions one would expect errors of both types to occur. It is the latter type that, I suggest, gives rise to experiences of ESP.

This is comparable to classical signal-detection theory. Figure 1 shows two distributions. For any given stimulus strength there could be just noise or noise plus a signal. At low signal-to-noise ratios, it is not possible to be a perfect detector. Mistakes are inevitable and may be either in missing a true signal or in thinking there is a signal when there is not. I am suggesting that believers in the paranormal (called "sheep" in psychological parlance) are more likely to make the latter kind of error than are disbelievers (called "goats"). In signal-detection theory, this is described in terms of a variable criterion. As the payoffs change, people may use a different criterion, making more of one kind of error and fewer of another. Their sensitivity (d') may not change when their criterion does (see Figure 2). It is not a question of right and wrong but of which kind of error you would rather make, given you have to make some.

One prediction of this approach is that those people who more frequently look for explanations of chance coincidences are more likely to have psychic experiences. Therefore, sheep should be those who underestimate the probability of chance coincidences.

It has long been known that probability judgments can be extremely inaccurate. Kahneman and Tversky (1973) have explored some of the heuristics, such as "representativeness" and "availability," that people

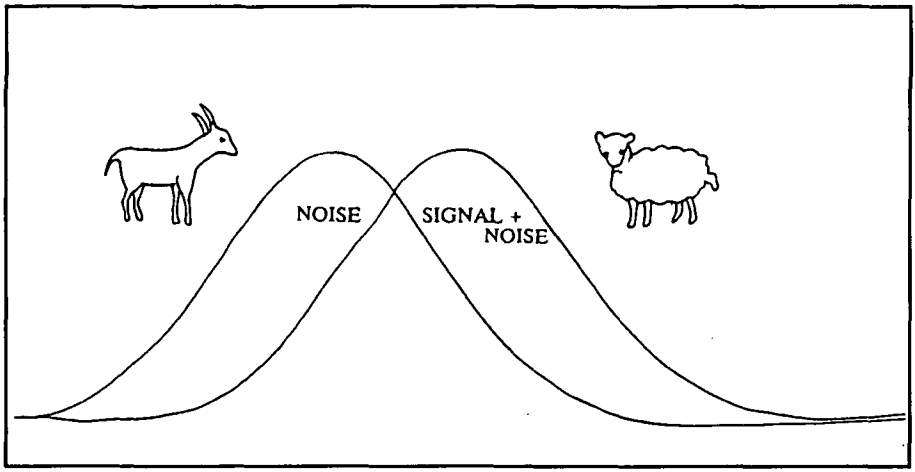


FIGURE 1. Sheep (believers in the paranormal) can be seen as more likely than goats (disbelievers) to decide that a connection is meaningful, a series of events nonrandom, or a form present in ambiguous images.

use to make judgments and that can give rise to serious errors. In addition, people have great confidence in erroneous judgments, even in the face of contrary evidence (Einhorn and Hogarth 1978). Falk and collaborators have investigated what makes people find coincidences surprising (Falk 1982; Falk and McGregor 1983). Adding specific but superfluous details can make coincidences seem more surprising, and things that happen to subjects themselves seem more surprising to them than the same things

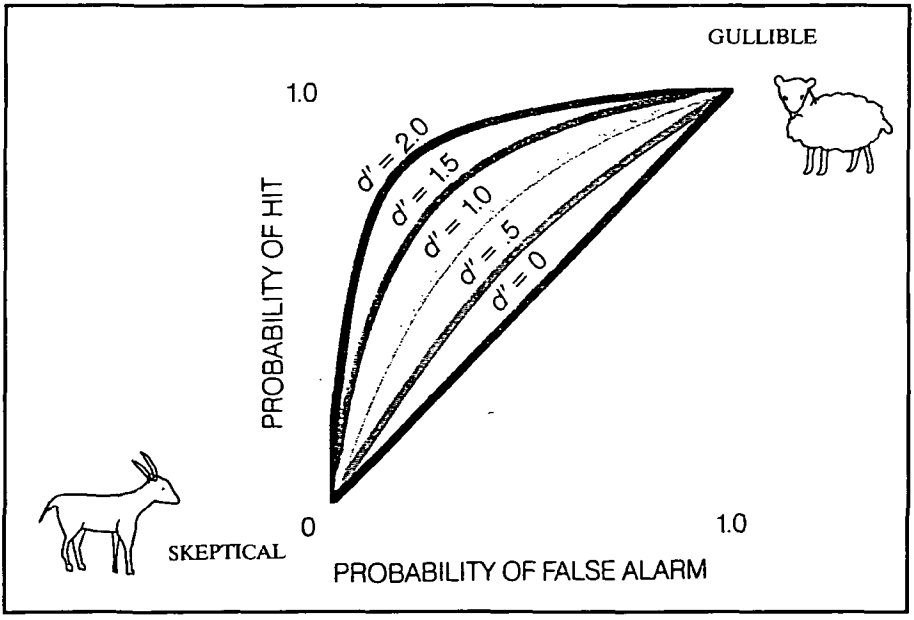


FIGURE 2. In an analogy with signal-detection theory, sheep and goats might have the same sensitivity (d') but differ in criterion.

happening to other people. Diaconis and Mosteller (1989) have reviewed some ways of studying the psychology of coincidences and have provided models for calculating probabilities.

There is, however, little research relating these misjudgments to belief in the paranormal or to having psychic experiences. Blackmore and Troscianko (1985) found that sheep performed worse than goats on a variety of probability tasks. For example, in questions testing for responsiveness to sample size, sheep did significantly worse than goats. The well-known birthday question was asked: How many people would you need to have at a party to have a 50:50 chance that two have the same birthday? (See Diaconis and Mosteller 1989 for a general model for this type of question.) As predicted, goats got the answer right significantly more often than sheep.

Subjects also played a coin-tossing computer game and were asked to guess how many hits they would be likely to get by chance. The correct answer, 10 hits in 20 trials, seems to be rather obvious. However, the sheep gave a significantly lower mean estimate of only 7.9, while goats gave a more accurate estimate of 9.6.

Further research is called for here. It would be interesting to test whether sheep and goats differ in the probability they assign to various kinds of coincidences happening both in laboratory tests and in assessing probabilities of real-world events.

2. *Illusions of Control*

Where the coincidence is between a person's own action and an event external to them, the same effect may be at work but the assumed cause will be personal control; or in the context of psi, it will be PK. This has been called the "illusion of control" by Langer (1975). Sheep have been found to show a greater illusion of control than goats in a psi task (Ayeroff and Abelson 1976, Jones et al. 1977; Benassi et al. 1979).

One might argue that if PK occurs then the perception of personal control in such tasks is not an illusion. This is less likely, given that no PK was found in these experiments. However, to rule out this as an explanation for the difference, Blackmore and Troscianko (1985) used a covert psi task. There was no evidence of PK and a greater illusion of control for sheep than for goats.

3. *Illusions of Pattern and Randomness*

Pattern and randomness cannot be unambiguously distinguished. In a long enough series of events, any combination or string of events is likely to occur by chance. However, the process of extracting pattern from noise is central to all sensory processes. As in the case of coincidences, two kinds of error can occur. One is the failure to detect patterns that are there; the second is the tendency to see patterns that are not there. We are arguing that the second type of error will make people search for a cause and that, since there is no cause, they may turn to paranormal explanations.

This predicts that people who make this type of error are more likely to have psychic experiences (or experiences they interpret as psychic) and hence to believe in the paranormal.

It has long been known that people are bad at judging randomness. In particular, when asked to generate a string of random numbers (subjective random generation, or SRG), people typically give far fewer repetitions of the same digit than would be expected by chance (see reviews by Budescu

1987 and Wagenaar 1972). This is related to the "Gambler's Fallacy," whereby some people think that a long string of reds must be followed by black. ESP experiments are often equivalent to SRG and show the same bias.

Blackmore and Troscianko (1985) found no differences between sheep and goats in SRG for strings of digits 1 to 5 or in the ability of sheep and goats to discriminate random sequences from biased ones. However, Brugger, Landis, and Regard (1990) did. They argued that the same variables affect ESP scoring and SRG in the same direction—variables like task duration, stimulant and depressant drugs, and age. They even suggest that many laboratory ESP findings may be explained by correspondences between target sequences and human biases. Although there is some evidence for this in studies giving immediate feedback (Gatlin 1979; Tart 1979), this cannot easily explain results obtained without feedback and with adequate target randomization.

They tested the relationship to belief in the paranormal in three experiments. SRG was studied in a telepathy experiment with five symbols to choose from. Sheep produced significantly fewer repetitions than goats did. Subjects intermediate in belief gave intermediate repetitions. There was no evidence of ESP occurring and no sheep-goat effect (i.e., sheep did not do better at the ESP test).

In a second experiment, SRG was studied in mimicking the roll of dice (6 choices). The same effect was found. Third, subjects were shown dice sequences with different numbers of repetitions and asked which was more likely to appear first by chance. Of course all strings were equally likely to occur, but subjects

"These findings suggest that we should expect to find a high incidence of psychic experience and widespread belief in the paranormal whether or not psychic phenomena ever occur."

tended to choose the string with fewer repetitions. Sheep did so more than goats, and the intermediate group was in between. These results appear to be highly consistent and to show the expected greater bias in sheep.

To test this further, Katherine Galaud, at Bristol University, carried out an experiment to compare SRG for different numbers of choices. It might be argued that most people can predict or calculate likely sequences when only two choices are involved but that the real world typically involves multiple choices and low probabilities. Perhaps SRG would be even less random when more choices are possible. Furthermore, differences between sheep and goats may be more extreme where more choices are available. This experiment studied the variation in results with different numbers of choices available.

One hundred twenty students were given the Belief in the Paranormal Scale (BPS) (Jones, Russell, and Nickel 1977), a randomness questionnaire, and a probability questionnaire. The probability questionnaire consisted of three questions based on the "taxi problem" (Kahneman and Tversky 1972) manipulated to give correct answers of 20, 40, and 80 percent. The randomness questionnaire asked subjects to generate strings of random numbers, choosing from the digits 1 to 2, 1 to 4, or 1 to 8, with expected numbers of

repetitions being 12, 6, and 3, respectively. No differences were found between sheep, goats, and intermediates (Blackmore, Galaud, and Walker, in press).

There are two differences between this experiment and Brugger's that might account for the different results. One is that Brugger et al. timed the generation of digits with a metronome. It could be that, given time to think about randomness, people can to some extent compensate for their biases and that untimed and unpressured responses like those in the present experiment cannot reveal them. However, it could also be argued that in real-life situations there is not usually time pressure. Another difference is that they used only one question on ESP to divide subjects into sheep, goats, and intermediates. Further experiments now under way at Bristol are trying to find out if these factors are responsible.

4. *Illusions of Form*

Object recognition can entail the same two types of error. A conservative approach means missing interesting forms that are there. A less cautious approach means seeing things that are not. Possibly, those people who are more likely to see forms when none is present are also more likely to see apparitions or ghosts or to seek paranormal explanations when none is required.

In a second experiment at Bristol, carried out by Catherine Walker (Blackmore, Galaud, and Walker, in press), we tested this and a related question. If sheep are more willing to see forms in noisy displays, is this an error compared with goats, or are goats more likely to miss forms that are present. This is the familiar question of accuracy versus criterion. Sheep might simply have a lower criterion for seeing forms than goats, with the same accuracy for discriminating forms, or they may actually make more errors altogether.

Fifty subjects were given the Belief in the Paranormal Scale and tested on an object-identification task. The stimuli consisted of four sets of seven pictures each; ranging from barely identifiable blobs to clear outline shapes (see Figure 3). The final shapes were two leaves, a bird, a fish and an axe. They were presented for 10 milliseconds each, with a mask of black dots on a white background shown between presentations. The four least identifiable stimuli were shown first, progressing through the series with the four at each level being randomized for order. The subjects were asked whether they could see any shape; and, if they could, what shape it was.

It was predicted that sheep would report seeing forms earlier in the series than goats but would not be any more accurate in identifying the forms. In other words, they would have a lower criterion for identification. This is exactly what was found. BPS scores did not correlate with the number of pictures correctly identified but did correlate closely with the number of incorrect identifications and the tendency to say there was a shape but not identify it. In other words, the sheep were more likely to make wrong guesses but were no worse at detecting the pictures that were there. Goats, although willing to say there was a shape, were less willing than sheep to guess at identifying it.

This confirms that sheep are more likely to claim to see identifiable forms in ambiguous stimuli, but there are many possible reasons for this. For example, creativity may correlate with belief in the paranormal and with tendency to see forms. Whatever the

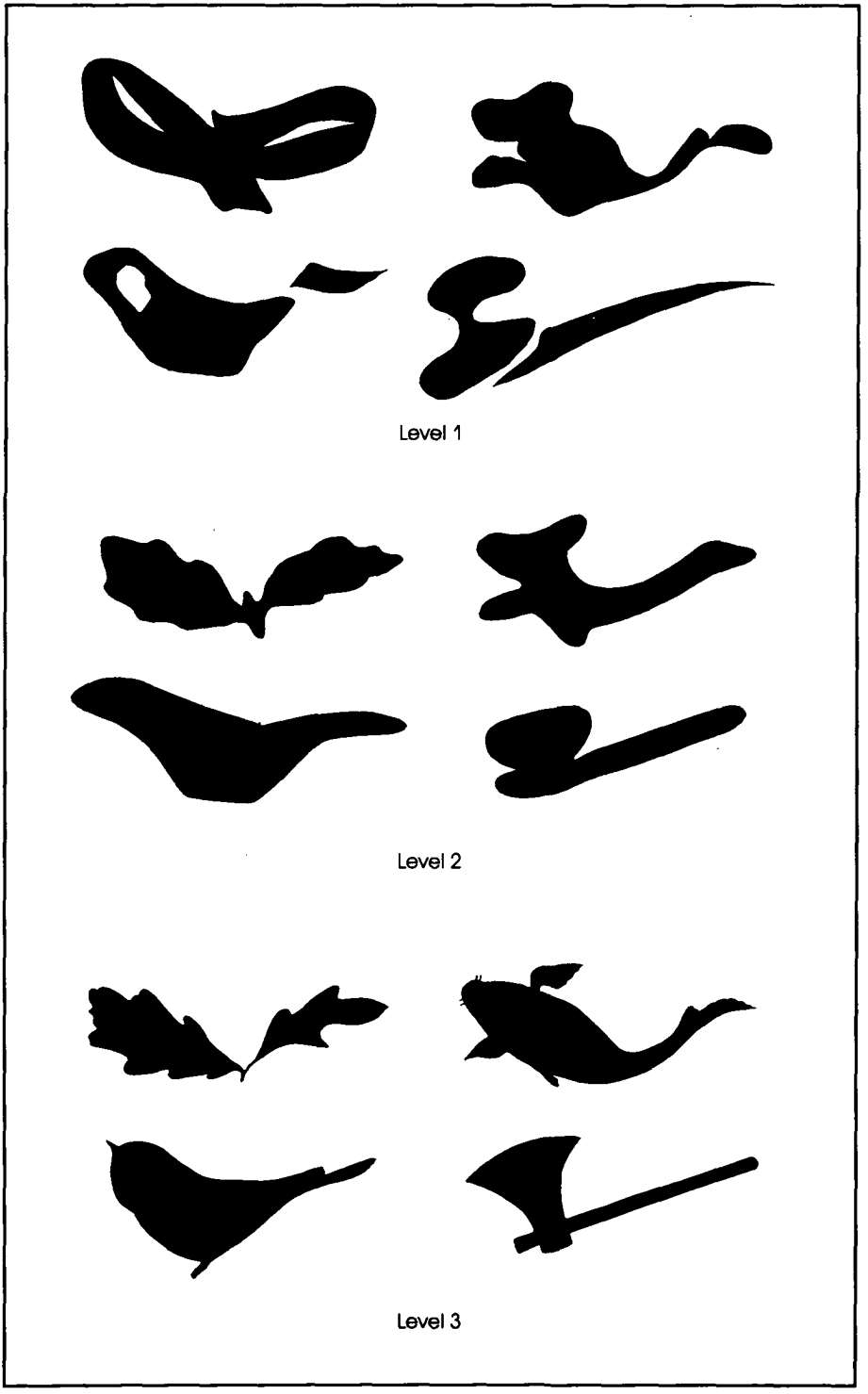


FIGURE 3. Examples of stimuli taken from Blackmore, Galaud, and Walker, in press. For each of the four forms there are seven levels of detectability. Three levels are shown here.

"Human beings, in trying to make sense of the world, must make mistakes. They miss things that are there and invent things that are not."

origins of the tendency, the findings fit with the idea that paranormal belief may be encouraged in those who more often see form in ambiguity.

5. *Illusions of Memory*

In addition to all the processes above, selective memory may make coincidences appear to occur more often than they do in fact occur. Hintzman, Asher, and Stern (1978) demonstrated selective remembering of meaningfully related events. Fischhoff and Beyth (1975) showed that people misremember their previous predictions to conform with what actually happened.

We might predict that people who are particularly prone to such memory effects are more likely to seek paranormal explanations and therefore to have psychic experiences and believe in the paranormal. If so, these effects would be greater for sheep than for goats, but this has not been tested.

The popularity of fortune-tellers may also depend to some extent on selective memory. Selective recall of meaningful coincidences and true statements about the person will add to the Barnum effect, or the tendency to accept certain kinds of personality readings as true of oneself but not of others (Dickson and Kelly 1985). If this is so we would expect the people who frequent fortune-tellers to be more prone to this kind of selective memory. Again this has not been tested, but a project is now underway at Bristol to investigate it.

Conclusions

Five types of psychic illusion have been explored. They may be the basis for many spontaneous psychic experiences that generate belief in the paranormal. The tendency for sheep to show many of these effects to a greater extent than goats tends to confirm this hypothesis.

This conclusion does not apply to many kinds of psi experiments, especially those giving no feedback and using sound randomization techniques. It therefore has no bearing on the issue of whether any laboratory experiments provide evidence for psi. Also in life outside the lab these processes may operate to produce psychic experiences and belief in the paranormal quite independently of whether genuinely paranormal phenomena ever occur.

These findings are therefore not so much evidence against the occurrence of paranormal phenomena as a suggestion that we should expect to find a high incidence of psychic experiences and widespread belief in the paranormal whether or not psychic phenomena ever occur.

The Nature of Skepticism

The whole basis of this approach is that human beings, in trying to make sense of their world, must make mistakes. On the one hand, they miss things that are there and, on the other, invent things that are not. This applies as much to simple signals as to complex correlations and to scientific theories as well as to perceptual ones. I have tried to show some of these in Figure 4.

In everyday life the equivalent of the sheep is someone who will see something interesting in everything. The problem is that they may be seeing things that are not there. The

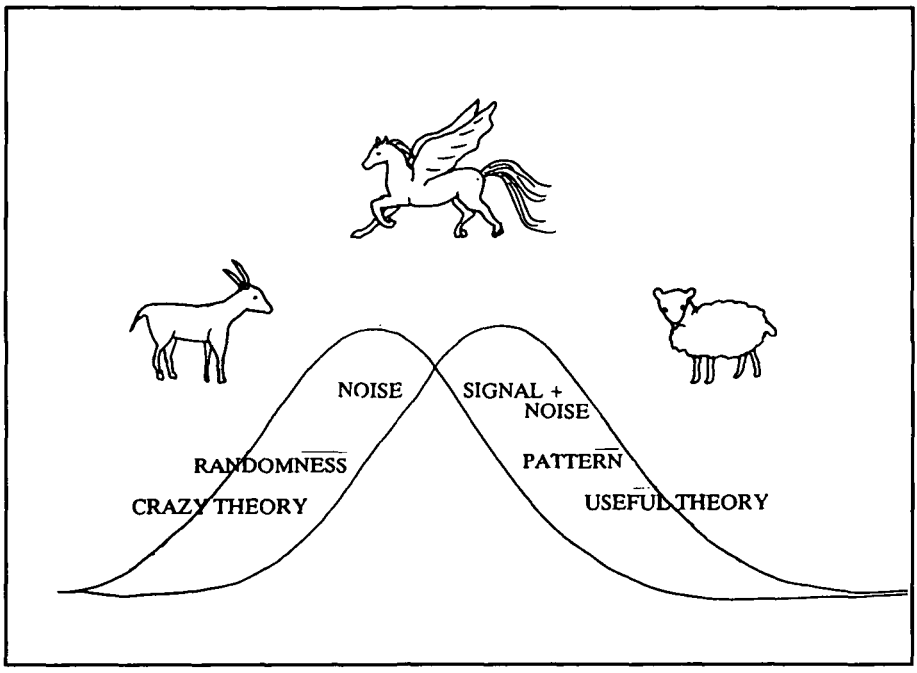


FIGURE 4. The true skeptic is not entrenched at one end of the spectrum.

equivalent of the goat is someone who needs lots of evidence before seeing or experiencing anything. They are likely to miss out on a lot of fun!

Similarly, in science the equivalent of the sheep is someone who enjoys every crazy theory and follows every faint lead. The problem is that they may easily be following a false lead. The equivalent of the goat is someone who takes no interest in wacky theories and sticks only to the conventional. They may be safe but are likely to miss the really exciting new theory when it comes along.

You takes your choice and with it the consequences—fun or boredom, fear of failure or love of novelty. But what of skepticism? I do not think the true skeptic is the goat. The true skeptic does not always stick to one end of the spectrum but can shift criteria as the circumstances demand. The true skeptic is as skeptical of the goat who denies everything as of the sheep who embraces everything (as is John Palmer's [1986] "progressive skeptic"). True skeptics can drop their fear of looking silly or curtail their love of the novel as appropriate; can apply caution or stick their neck out according to their understanding of the issues. The true skeptic is not the ultimate goat but something more like a flying horse.

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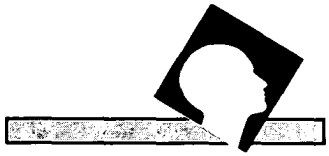
The Scientist's Skepticism

MARIO BUNGE

Those of us who question the beliefs in ghosts, reincarnation, telepathy, clairvoyance, psychokinesis, dowsing, astral influences, magic, witchcraft, UFO-abductions, graphology, psychic surgery, homeopathy, psychoanalysis, and the like, call ourselves "skeptics." By so doing we wish to indicate that we adopt Descartes's famous methodical doubt. This is just initial distrust of extraordinary perceptions, thoughts, and reports. It is not that skeptics close their minds to strange events but that, before admitting that such events are real, they want to have them checked with new experiences or reasonings. Skeptics do not accept naively the first things they perceive or think; they are not gullible. Nor are they neophobic. They are just critical; they want to see evidence before believing.



There are two kinds of skepticism. Only one is part of the scientific outlook.

Two Kinds of Skepticism

Methodical doubt is the nucleus of *methodological skepticism*. This kind of skepticism must be distinguished from *systematic skepticism*, which denies the possibility of any knowledge and therefore entails that truth is inaccessible, and the search for it vain. The skeptics of both varieties criticize naiveté and dogmatism, but whereas methodological skepticism urges us to investigate, systematic skepticism blocks research and thereby leads to the same result as dogmatism, namely, stagnation or worse.

The craftsman and the technologist, the manager and the organizer, as well as the scientist and the authentic philosopher, behave as methodological skeptics even if they have never heard about this approach—and even if they behave naively or dogmatically after work hours. In fact, in their professional work they

are not gullible, nor do they disbelieve everything, but they mistrust any important idea that has not been put to the test and demand the control of data as well as the test of conjectures. They look for new truths instead of remaining content with a handful of dogmas, but they also hold certain beliefs.

For example, the electrician makes some measurements and tests the installation before delivering it; the pharmacologist tests the new drug before advising to proceed to its manufacture in industrial quantities; the manager orders marketing research before launching a new product; the editor asks for advice of referees before sending a new work to the printer; teachers test their students' progress before evaluating them; mathematicians attempt to prove or disprove their theorems; physicists, chemists, biologists, and psychologists design and redesign experiments by means of which they test their hypotheses; the sociologist, the serious economist, and the political scientist study random samples of the populations they are interested in before announcing generalizations about them—and so on. In all these cases people search for truth or efficiency and, far from admitting uncritically hypotheses, data, techniques, and plans, they bother to check them.

On the other hand, the theologians and school philosophers, the neoclassical economists and messianic politicians, as well as the pseudoscientists and the counterculture gurus, indulge in the luxury of repeating dogmas that either are untestable or have failed rigorous tests. The rest, those of us who make a living working with our hands, producing or diffusing knowledge, organizing, or managing organizations, are supposed to practice methodological doubt.

Methodological skepticism is a methodological, practical, and moral stance. Indeed, those who adopt it believe that it is foolish, imprudent, and morally wrong to announce, practice, or preach important ideas or practices that have not been put to the test or, worse, that have been shown in a conclusive manner to be utterly false, inefficient, or harmful. (Note the restriction to *important* beliefs; by definition, trivialities are harmless even when false.)

Because we trust research and action based on research findings, we are not systematic skeptics. We disbelieve falsity and suspend judgment concerning whatever has not been checked, but we believe, at least temporarily, whatever passed the requisite tests. At the same time, we are willing to give up whatever beliefs prove to be groundless. In sum, methodological skeptics are constructive. . . .

The Scientist's Skepticism

It is impossible to evaluate an idea in and by itself, independently of some system of ideas that is taken as a basis or standard. When examining any idea we do so in the light of further ideas that we do not question at the moment; absolute doubt would be as irrational as absolute belief. Hence systematic or radical skepticism is logically untenable. By the same token, every methodological skeptic has some creed or other, however provisional it may be.

For example, we evaluate a mathematical theorem in the light of its premises and the laws of logic—and in turn the latter are evaluated by their fertility and consistency with mathematics. We judge a physical theory by its logical consistency and its mathematical tidiness as well as according to its harmony with other physical

theories and its correspondence with the relevant empirical data. We evaluate a chemical theory according to the physical theories it takes for granted and according to whether or not it jibes with other chemical theories as well as with the relevant experimental data. We proceed in a similar manner with the remaining sciences. In particular, we demand that psychology does not violate any biological laws and that the social sciences respect psychology and harmonize with one another. (The fact that mainstream economics and politology do not care for other social sciences is precisely a point against them.)

In other words, the scientist's skepticism is methodological and partial, not systematic and total. Serious researchers are neither gullible nor nihilistic; they do not embrace beliefs uncritically, but do admit, at least until new notice, a host of data and theories. Their skepticism is constructive, not just critical.

Moreover, in every case the methodological or moderate skeptic presupposes—albeit seldom explicitly—that scientific theories and methods satisfy certain philosophical requirements. These are (*a*) *materialism:* everything in the universe is concrete or material, though not necessarily corporeal, and everything behaves lawfully; (*b*) *realism:* the world exists independently of those who study it, and moreover it can be known at least partially and gradually; (*c*) *rationalism:* our ideas ought to be internally consistent and they should cohere with one another; (*d*) *empiricism:* every idea about real things should be empirically testable; and (*e*) *systemism:* the data and hypotheses of science are not stray but constitute a system (for details, see Bunge 1983a, 1983b).

No doubt, few scientists realize that these five principles are indeed presupposed in scientific research. However, it does not take much to show that (*a*) if any of the preceding principles were relinquished, scientific research would miscarry, and (*b*) the main difference between science and pseudoscience is not so much that the former is true and the latter false, but that pseudoscience does not abide by those principles—as a consequence of which it seldom delivers truth and it never corrects itself.

"Methodological skeptics are not gullible, but they do not question everything at once either. . . . Theirs is a qualified, not indiscriminate skepticism."

Not all skeptics share these philosophical principles. Most of them believe that only scientific method applied to data-gathering is required to conduct scientific research. However, it is possible to apply the scientific method to a nonscientific investigation, such as trying to measure the speed of ghosts or the intensity of the action of mind on matter. To yield knowledge, the scientific method must be accompanied by a scientific world-view: materialist, realist, rationalist, empiricist, and systemic. This is the core of a skeptic's credo.

Conclusion

Methodological skeptics are not gullible, but they do not question everything at once either. They believe whatever has been demonstrated or has been shown to have strong empirical support. They disbelieve whatever clashes with logic or with

the bulk of scientific knowledge and its underlying philosophical hypotheses. Theirs is a qualified, not indiscriminate skepticism.

The methodological skeptics uphold many principles and, above all, they trust humans to advance even further in the knowledge of reality. Their faith is critical, not blind; it is the explorer's faith not the believer's. They do not believe anything in the absence of evidence, but they are willing to explore bold new ideas if they find reasons to suspect that they have a chance (see, for example, Bunge 1983c). They are open-minded but not blank-minded; they are quick to filter out intellectual rubbish.

For example, methodological skeptics find no reason to engage in experimental investigations before denying that pure thought may energize machines, that surgery can be performed by sheer mental power, that magical incantations or solutions of one part in ten raised to the 100th power have therapeutic power, that perpetual-motion machines can be built, or that there are solve-all theories. All such beliefs can be demolished by wielding some well-tested scientific or philosophical principles. This strategy is certainly cheaper than naive empiricism.

To conclude. Pseudoscience and pseudotechnology are the modern versions of magical thinking. They must be subjected to critical scrutiny not only to clean up culture but also to prevent quacks from cleaning out our pockets. And to criticize them it is not enough to show that they lack empirical support—for, after all, one might believe that such support could be forthcoming. We must also show that those beliefs in the arcane or in the paranormal clash with either well-established scientific theories or fertile philosophical principles. For this reason, the criticism of magical thinking should be a common endeavor of scientists, technologists, philosophers, and educators. Given the massive commerical exploitation of junk culture, as well as the current decline in the teaching of science and technology in numerous countries, unless we work harder on debunking pseudoscience and pseudotechnology we shall be in for a sharp decline of modern civilization (see Bunge 1989).

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The Persistent Popularity of The Paranormal

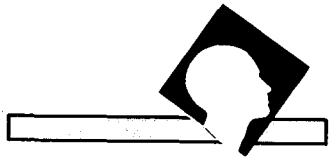
JAMES LETT

Paranormal beliefs are firmly entrenched in our society. An overwhelming majority of all Americans hold at least some beliefs that are nonrational, nonscientific, and nonsensical (Gallup and Newport 1991), and the level of paranormal belief in the United States actually seems to be increasing (Frazier 1987). The irony, of course, is that no culture in the history of humanity has ever possessed a greater store of objective, accurate, and reliable knowledge about the universe.

That irony is well appreciated by the physicist Victor Stenger, who offers a thorough critique of transcendental claims in his recent book *Physics and Psychics.* Stenger (1990:298) writes that he is "astonished that so many people in a modern nation like the United States still take the paranormal seriously," and then he goes on to say that he "shudder[s] at what this fact implies about the general state of scientific education in America."

As a science educator, I share Professor Stenger's concerns about the deplorable state of scientific education in our country. Those concerns have led me to develop a course at my college called "Anthropology and the Paranormal," which attempts to teach students the fundamentals of critical thinking (Lett 1990). As an anthropologist, however, I am not at all astonished by the popularity of the paranormal, and I am aware that all of my best efforts, and all of the collective best efforts of all the world's scientists and skeptics, are not likely to appreciably diminish the level of paranormal belief.

To understand why that's true, you simply have to look at the underlying reasons for the



The battle to diminish paranormal beliefs is certainly worth fighting, but scientists and skeptics should realize that it will probably never be won.

popularity of the paranormal. Those reasons are well understood by anthropologists and widely appreciated by many other skeptics (see, for example, Singer and Benassi 1981; Kurtz 1984; Asimov 1986). In brief, the popularity of the paranormal in the United States can be attributed to four principal factors: the uncertainty of the public, the unreliability of the media, the inadequacy of the educational system, and the inaccuracy of the American worldview. Let me review each of the factors in turn, and then consider why they ensure the persistence of paranormal beliefs.

1. *The Uncertainty of the Public.* Anthropologists have documented the fact that religion is a cultural universal. Belief in the supernatural—in a reality that is not necessarily amenable to the five senses—occurs in every society on the planet. American culture is hardly unique in having a range of paranormal beliefs. What is remarkable about American culture at the moment is that paranormal beliefs seem to be proliferating, and that presents an interesting anthropological puzzle. Why are the proponents of some of the most preposterous and platitudinous forms of the paranormal able to attract such wide followings?

The answer is fairly simple. Since early in this century, when Bronislaw Malinowski first published the results of his ethnographic research in the southwestern Pacific, anthropologists have known that people are likely to turn to magical solutions to solve their problems when practical solutions are unavailable. In a classic study, Malinowski noticed that the inhabitants of the Trobriand Islands always used magical rituals to protect themselves when fishing in the rough, shark-infested waters of the open ocean, but never turned to magic when fishing in the calm, protected waters of the lagoon. He concluded that human beings are likely to seek reassurance in paranormal beliefs whenever they face situations where the outcome is uncertain or beyond their control. Subsequent anthropological research around the world has confirmed the obvious truth of Malinowski's principle.

It might seem, then, that the level of paranormal belief in the United States should be on the decline, given the scientific advances of the past century that have substantially increased our understanding and control of so many facets of reality. However, the evidence indicates that the average American's degree of certainty and security about life has actually decreased over the past generation or so, at the same time that the incidence of paranormal beliefs has increased. The reason? In a phrase, rapid and profound culture change.

Millions of Americans are increasingly bewildered and disoriented by the far-reaching changes that have occurred in virtually every aspect of daily life since World War II. The American family has undergone radical restructuring, sexual morality has been turned upside-down, gender roles have been substantially redefined, the birth rate has dropped, the divorce rate has jumped, the crime rate has soared, the cost of living has skyrocketed, the quality of American-made goods and services has plummeted, the average real income of American households has fallen, the international power and prestige of the country has declined, the impoverished underclass has mushroomed, and the American dream of home ownership has become unattainable for increasing numbers of middle-class citizens. The population of the planet is growing at an alarming rate, the world's natural resources are being readily depleted, the environment is suffering calamitous abuse, and the

threat of nuclear annihilation still hangs over the whole of humanity.

Small wonder, then, that millions of Americans are suspicious of the present and fearful of the future. At the beginning of the past decade, the anthropologist Marvin Harris (1981) noted these trends in American life and linked them to a number of phenomena, including the rise of the Moonies and other nontraditional religious cults, the popularity of Carlos Castaneda's shamanic mysticism, the development of Scientology, the growth of Transcendental Meditation and other self-help strategies, and the emergence of the televangelists. What was true ten years ago is even more true today. For millions of Americans, life is a perplexing, frightening, and unsatisfying whirl, and they are looking for a way off the merry-go-round. They are looking for answers.

It should be no surprise that millions of Americans find their answers in paranormal beliefs. At a time when traditional religious institutions are declining in influence (because of their increasing irrelevance to the new facts of daily life), paranormal beliefs are emerging as the new folk religions. The reason, as Isaac Asimov (1986:212) pithily puts it, is obvious: "Inspect every piece of pseudoscience and you will find a security blanket, a thumb to suck, a skirt to hold." Paul Kurtz (1986) argues that the tendency to embrace nonempirical explanations of puzzling phenomena is deeply rooted in the human psyche—he calls it the "transcendental temptation." I would agree. By their nature, human beings are meaning-seeking animals, but the sad conclusion of cross-cultural anthropological research is that most individual humans, and all human cultures, are content with the *illusion* of meaning. For most people, it matters not, apparently, whether their explanations are true or false; it only matters that they are emotionally satisfying. For millions of Americans, paranormal beliefs fulfill that criterion.

"Human beings are likely to seek reassurance in paranormal beliefs whenever they face situations where the outcome is uncertain or beyond their control."

2. *The Unreliability of the Media.* Book and magazine publishers, television and movie producers, and newspaper and broadcast journalists are all sure about one thing when it comes to the paranormal: it sells. There is a huge market for stories (true or not) about ghosts, reincarnation, ESP, psychics, UFOs, ancient astronauts, Bigfoot, the Bermuda Triangle, and every other imaginable variety of the paranormal, and the media reap huge profits by producing a large quantity of uncritical material to supply that demand.

The entertainment media unashamedly fuel the public passion for the paranormal. They do so even when they themselves—writers, editors, and producers—recognize this nonsense for what it is. Time-Life Books, for example, is promoting a best-selling series of pro-paranormal books called "Mysteries of the Unknown," despite the fact that the editors know very well that nothing of what they are publishing is either mysterious or unknown. (*Time* magazine has frequently published skeptical stories about the paranormal, including, for example, a December 7, 1987, cover story about the New Age, and a June 13, 1988, feature article

about magician/investigator James Randi.)

The news media, which are regulated to a certain extent by both the law and their own professional standards, supposedly offer the public the objective truth about paranormal phenomena. In practice, however, the news media are only slightly more skeptical than the entertainment media; far too frequently, they are just as credulous when it comes to the paranormal.

The infamous Tamara Rand hoax is widely recalled by skeptics (Frazier and Randi 1981), although it has undoubtedly been forgotten by the general public. Rand was the self-professed psychic who claimed to have accurately predicted the attempted assassination of Ronald Reagan in March 1981. Four days after John Hinckley shot the president, three of the four major television news networks broadcast a videotape of Rand's prediction, which she said was made more than two months before the assassination attempt. Investigation revealed that the tape had been made 24 hours after the shooting; after repeated requests from CSICOP, the networks retracted their stories.

The real indictment, however, lies not in the fact that the networks were slow to correct their error, but in the fact that they could ever have made such an error in the first place. How could the networks have reported such an improbable story without any preliminary investigation whatsoever? No such lack of skepticism would be applied to any political story by any self-respecting journalist. The unfortunate truth is that the lessons of the Tamara Rand incident made little impression upon the news media. They continue to apply the same uncritical standards in their reporting on the paranormal.

In his book *Superstition and the Press*, the distinguished journalism professor Curtis MacDougall (1983) compiled a voluminous list of preposterous paranormal claims that had been credulously reported by reputable newspapers in American cities. MacDougall died in 1985, but an equally energetic reader and clipper would be able to compile an annual update that would add substantially to MacDougall's 600-page book. (In fact, the Education Subcommittee of CSICOP maintains such a file—see Feder 1987-88.) The broadcast media, as a whole, are equally uncritical.

There are two reasons for the paranormal receiving such a prominent play in the news media. In the first place, journalists know that the public is greatly interested in stories about the paranormal, and there are major incentives—they are called ratings and circulation—to give the public what it wants. In the second place (and this is the more disturbing and more dangerous of the two factors), most journalists lack the knowledge, training, and experience to critically evaluate paranormal claims. Journalism professor Philip Meyer (1986:39-40) admits that many journalists don't even care about the objective truth of the matter: "It doesn't make any difference what the facts are—if somebody with an impressive-sounding degree or title says something interesting, then it's a story."

As a cultural anthropologist, I have many things in common with journalists: both of us are interested in observing, recording, describing, and explaining human behavior. There are important differences between us, however, one of which is the way we define "objectivity." As a scientist, objectivity means, for me, being fair to the truth; for the journalist (and I speak from personal experience, having spent time as a television

journalist), objectivity means being fair to everyone involved.

I've written about these issues before (Lett 1986; 1987), and my conclusion is that journalists are not likely to become skeptics. As long as the paranormal sells, journalists cannot afford to debunk it. They are, after all, competing with the entertainment media for the attention of the public. News coverage of the notorious shroud of Turin provides an illuminating example. On September 27, 1988, when it was publicly revealed that radiocarbon dating had proved that the shroud could not be the burial cloth of Christ, ABC News reported that scientists were nevertheless baffled as to how the image could have been made. Not true, of course—scientists know very well how the image could have been made (see Nickell 1983; 1989)—but that's what journalistic "objectivity" means.

I am aware that there are exceptions. Beginning on November 28, 1988, to name one outstanding instance, "Good Morning America" broadcast a three-part series on astrology by ABC News consumer editor John Stossel. Stossel was unabashedly skeptical in his report—he called astrology "total nonsense"—and he did an excellent job of clearly and forcefully debunking the paranormal claims of Hollywood astrologer Joyce Jillson. Nevertheless, such reports are by far the exception rather than the rule in broadcast news.

The real significance of the fact that the media are generally uncritical lies in the fact that the media are, in addition, highly pervasive and highly influential (see Kottak 1990). The media are an important agent of enculturation for all Americans, and they are a predominant source of information for Americans who have completed their formal schooling. Most adult Americans depend primarily upon the media for their knowledge and understanding of the world. The knowledge offered by the media is hardly reliable, however. On balance, the message of both the entertainment and the news media with regard to the paranormal is the same: namely, that there is, or at least very well may be, another dimension to ordinary reality that is well known to the average citizen but obscure to established scientists, who tend to be cloistered, conservative, and closed-minded. Obviously that message is highly misleading.

"Human beings are meaning-seeking animals, but the sad conclusion of cross-cultural anthropological research is that most individual humans, and all human cultures, are content with the illusion *of meaning."*

3. *The Inadequacy of the Educational System.* The scientific method has been responsible for an enormous and unprecedented increase in the fund of human knowledge in the past century, yet the American public-educational system fails to teach students the basic principles of that method. Beginning in grade school, and continuing, unfortunately, through high school and college, students are taught science as though it were a body of facts, a dry and static subject matter, rather than a technique for acquiring knowledge. The skills of evidential reasoning and logical analysis that are the heart of the scientific approach are rarely identified and examined; instead, students are given the task of memorizing the products of past scientific research.

These points are well appreciated

by many science educators, of course, especially at the university level. Charles Vigue (1988:326), for example, is a biology professor who helped develop an interdisciplinary course called "The Nature of Science," which explores such topics as "deductive and inductive logic," "scientific methodology," "causal and noncausal explanation," "the interpretation of data," and the like. Nevertheless, these topics are rarely addressed in pre-collegiate science classrooms, and they continue to be deemphasized in post-secondary curricula.

All of which means that most students finish their schooling without developing their abilities to think critically, reason logically, or evaluate properly. They have learned to respect the accomplishments of science, and they have learned to recognize the superficial trappings of science (such as lofty credentials, impressive jargon, lengthy citations, and professional conferences). Unfortunately, a little learning can be a dangerous thing, because that leaves students easy prey for pseudoscientists, who can often claim those same superficial trappings for themselves.

4. *The Inaccuracy of the American Worldview.* Every culture has a "worldview," a set of assumptions about the nature of reality, and every culture's worldview is a mix of sense and nonsense. The American worldview—to which all of us who are native members of U.S. society are enculturated from the moment of birth—includes a large number of erroneous assumptions.

Consider, for example, the following propositions: polygraphists can detect lies; graphologists can discern personality traits from handwriting samples; psychotherapists can diagnose, treat, and cure "mental illnesses" based on a scientific understanding of human personality processes; alcoholism is a disease (as are drug addiction, overeating, undereating, and any number of antisocial activities and proclivities, such as an apolitical motivation for political assassination); human beings have souls, which are in some way independent of their bodies; there is life after death; a benevolent, omnipotent, omniscient deity exists and is concerned about the personal fate of every individual on the planet.

Each of these assumptions is part of the American worldview; each is widely accepted by the great majority of Americans, each enjoys considerable prestige, and each is firmly institutionalized in the legal, social, political, economic, and educational systems of our culture—yet each is, by any reasonable measure, patently and completely untrue. None of them enjoys evidential support, and none of them can withstand logical and empirical scrutiny. Because these propositions are part of the culture's worldview, however, most Americans take them for granted and regard them as obvious givens. Indeed, as far as most Americans are concerned, anyone who would even think to question these basic assumptions would have to be lacking in common sense.

These dubious assumptions about the nature of reality can pose a fundamental obstacle to the rational investigation of paranormal phenomena. Using the methods of scientific investigation, for example, you can show someone that extrasensory perception does not exist (or at least that it has never been demonstrated), and the average American is likely to respond (as many of my students have) with the following syllogism: I know that God exists; the proposition that God exists cannot be substantiated by the methods of scientific investigation; therefore there must be something wrong with the methods

of scientific investigation, at least when those methods are applied to the supernatural (or paranormal). That argument is perfectly valid; it is, of course, unsound, because the first premise is indefensible, but for psychological and political reasons it can be very difficult to explain that to students.

In short, when we try to decrease the incidence of paranormal beliefs in American society by appealing to the rationality of Americans, we are fighting an uphill battle, because we are dealing with an audience that has been persuaded that nonrational thinking is perfectly appropriate in some cases. Moreover, when we use rationality to attack beliefs like precognition and psychokinesis, we are implicitly attacking such beliefs as the efficacy of psychotherapy and the immortality of the soul. The degree of intellectual and emotional commitment to such beliefs is overwhelming, and it is a rare individual who will examine the merits of that commitment.

Collectively, I believe, these four factors—the uncertainty of the public, the unreliability of the media, the inadequacy of the educational system, and the inaccuracy of the American worldview—explain the popularity of paranormal beliefs in American culture today. The stresses and strains of life account for the *appeal* of paranormal beliefs, the uncritical publication of extraordinary claims accounts for the *source* of paranormal beliefs, and the widespread inability to think critically, together with the cultural legitimization of uncritical thinking, accounts for the *persistence* of paranormal beliefs.

The only way to diminish the incidence of paranormal beliefs, then, is to address all four problems: to somehow reduce anxiety, revamp the media, reform education, and revise the culture's worldview. That's a daunting task, and the sad truth is that it will probably never be accomplished. We *might* someday succeed in inspiring the media to be more responsible on these subjects (although I doubt it), we *might* manage to restructure the educational system (although I suspect the possibility is remote), but we will *never* be able to appreciably reduce anxiety, because we will never be able to eliminate the sources of anxiety. As long as death, disease, disability, disaster, and disharmony exist, paranormal beliefs will flourish.

"No amount of training in evidential reasoning will be sufficient to dissuade most people from beliefs to which they have a strong emotional commitment."

I know from personal experience that showing people the facts, and teaching them how to think critically, will not necessarily be enough to get them to abandon paranormal beliefs. In teaching my course on "Anthropology and the Paranormal," I'm often able to persuade my students that the evidence doesn't support their belief in the Loch Ness monster or levitation or spontaneous human combustion, but I rarely succeed in persuading students that the evidence doesn't support their belief in life after death. No amount of training in evidential reasoning will be sufficient to dissuade most people from beliefs to which they have a strong emotional commitment.

Nevertheless, I am not willing to capitulate and to allow irrationality to go unchallenged. I agree in principle with Carl Sagan (1986:227) that "the best antidote for pseudoscience . . .

is science," and I believe that the wide-ranging efforts of CSICOP represent our best hope for an effective response to paranormal beliefs. We should encourage scientists to share their knowledge with the general public, just as we should encourage journalists and other members of the mass media to exercise responsible judgment in the publication of nonfiction (and everything proffered as nonfiction). We should insist that instruction in critical-thinking skills be incorporated into educational curricula at all grade levels. We should, in addition, encourage the deinstitutionalization of pseudoscience in our culture (for example, I would support efforts to make it illegal for psychotherapists to give expert testimony in court).

What we shouldn't do, however, is delude ourselves. Skepticism, unfortunately, isn't a drug that will cure irrationality, or even a vaccine that will prevent it; at best, skepticism is only an antidote to an insidious poison. The problem, however, is that the antidote of skepticism isn't effective for everyone who's exposed to the poison. It's only effective for people who have the qualities of heart and mind required to face the anxieties and uncertainties of life without the quick comfort and simple answers offered by paranormal beliefs. As long as those qualities remain in short supply among the general public, paranormal beliefs will continue to be prevalent.

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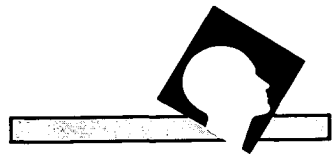
Self-Help Books

Pseudoscience in the Guise of Science?

EILEEN GAMBRILL



A review of benefits and dangers of self-help books and a consumer's guide to selection of self-help material.

Self-help books are a tradition in the United States (Starker 1989), and they have long been recognized as sources of moral guidance. As Starker (1989:15) describes, they "became increasingly established in the eighteenth century as a repository of useful and practical knowledge. [They] offered readers advancement in skill, wealth, and social status under the tutelage of successful and respected figures while remaining within the framework of the Protestant ethic." Benjamin Franklin's writings encouraged people to advance socially through their own efforts. He himself kept track of 17 virtues, such as temperance ("Eat not to dullness.") and tranquility ("Be not disturbed by trifles"), in an effort to alter his own behavior (Silverman 1986). Self-improvement books provided religious leaders a format for diffusing prescriptive guidelines; and, indeed, self-help books "emerged from a religious context" (Starker 1989: 37).

In his book *Oracle at the Supermarket* (1989: 10), Starker writes that the self-help book in America "appears to occupy a social niche roughly on a par with that of the legendary oracle at Delphi. Offering wisdom and enlightenment at discount prices, it has the ability to speak with a vast audience on a variety of topics and provides specific directions for achieving love, health, money, peace of mind, and any number of practical skills." Social historians have suggested that *self* is a modern-day term for "soul" and that there has been a progression from the use of "the soul" to "the mind" and now to "the self." If this is true, then indeed Starker (1989) is correct in viewing self-help books as a modern-day oracle replacing older sources of guidance, such as organized religion. A belief in mind power (the power to change

through changing what we think) is a key part of the "American myth of success" (Weiss 1969; see also Wyllie 1954).

In the broadest sense, a self-help book could be any book that helps people in some way, whether or not the author expresses an intent to help. For example, in this broad sense the Bible could probably be described as the most popular self-help book. My concern here is with self-help books related to self-change (not those that describe how to build a bookcase or how to repair a television set). Rosen (1981: 190) defines a self-help book by "the claims and contents of the book itself. This leaves responsibility for labeling a book as 'treatment' where it belongs, namely, in the hands of the one who writes the book"—and, it could be added, in the hands of the publishers who prepare bookjackets and other promotional materials.

Sales of self-help books are increasing (Rosen 1987). About two thousand are published each year (Doheny 1988). Audio cassettes and videotapes have also entered the self-help market. A recent study found that 60 percent of psychologists prescribe self-help books to supplement their treatment (see Starker 1988). Some of these books do seem to offer readers what they promise (see, for example, DeAngelis 1991). I will first review potential benefits and dangers of self-help books and then present guidelines potential consumers can use in selecting self-help material.

Potential Dangers and Benefits of Self-Help Books

It could be argued that guidelines to help consumers select self-help books that deliver what they promise are not appropriate because people read such books for entertainment. But do they? Research into why people read self-help books indicates that, when they spend their money and time on them, people indeed seek certain promised outcomes. As Starker (1989:10) notes: "Inasmuch as self-help books are dispensing advice to millions on matters physical, psychological, and spiritual, they cannot responsibly be ignored by social scientists and health care professionals. Questions regarding their relative merits and potential dangers deserve careful attention."

What are the possible benefits? They include the attainment of desired outcomes with little expenditure of time, money, and effort, and access to accurate information about particular outcomes or problems of interest (e.g., social anxiety, depression) as well as about the conditions required for self-change. Other possible benefits include enhancing self-change skills and decreasing beliefs that get in the way of self-change.

Dangers of ineffective self-help materials have been described by Rosen (1981). These include an increase in hopelessness and helplessness when desired outcomes do not occur, neglect of other methods that might be successful—such as consulting a clinician—and a worsening of problems. Additional dangers include the fostering of superstitious beliefs and the suppression of real sources of influence over valued outcomes. This may make attainment of desired goals less likely. Self-help books may increase rather than decrease incorrect views about self-change and how it can be accomplished. They may encourage a dysfunctional focus on the self and on one's problems or encourage the unrealistic view that life should be without problems (see, for example, Barsky 1988; Kayne and Alloy 1988) and may foster dysfunctional attributions (see Taylor and Brown 1988 for a discussion of the value of positive illusions).

The Suppression and Mystification of Real Sources of Influence

Self-help focuses on the individual who is attempting to alter his or her own behavior, thoughts, or feelings to attain specific goals. Individual change, however, is but one level of intervention. Many other levels may be required to attain valued outcomes like losing weight or becoming less anxious, less depressed, or happier. The focus on self-help obscures the role of political, social, and economic factors that influence most of the behaviors that individuals try to alter through self-change. This focus also often exaggerates the potential a person has to alter his or her environment and self (Gambrill 1990). It's like using only a few of the keys on a piano to play a polonaise.

Let's take a look at stress, for example. Many factors related to stress are environmental—high noise levels, hours spent on crowded smoggy highways commuting from home to office, pressure to make more money to buy discretionary consumer items, and so on.

The fundamental attribution error (that of overlooking environmental causes of problems and focusing on dispositional causes) is common and is likely to be encouraged by a focus on the self (Nisbett and Ross 1980; Miller and Porter 1988). Encouraging a focus on the self may increase depression in people who already tend to focus extensively on themselves (Kayne and Alloy 1988). Self-help books may encourage unhelpful views of "the self" (for example, they may support a search for the "true self.") I have already noted the continuity of the terms *soul, mind,* and *self*. Thus the term *self* is a heavily loaded, almost sacrosanct concept, and writers and publishers of self-help books often take advantage (sometimes to the detriment of their readers) of this heavily value-laden term and the

ideology that accompanies it—that there are no limits to what can be accomplished through self-change.

Rosen (1981) has for some time pointed out the dangers of self-help books written by psychologists (see also Becvar 1978; Barrera, Rosen, and Glasgow 1981). Have these warnings been taken to heart? Hardly. As he points out, even psychologists who argue against publication of untested material themselves often go on to publish self-help books with exaggerated, untested claims (Rosen 1990). As Rosen (1990:3) writes, consumers are being "flooded with new untested do-it-yourself therapies."

What Do We Know About Self-Change?

Self-help books usually promise great changes with little effort. Is that possible? If so, under what conditions? Are there limits to self-help? If so, what are they? Under what conditons do they arise? We know a great deal about the potential for and limitations of self-change. (See, for example, Agran and Martella 1991; Kanfer and Schefft 1988; Mahalik and Kivlighan 1988; Peterson 1983; Prochaska et al. 1985; Scogin et al. 1990; Stuart 1977; Watson and Tharp 1989). The potential is impressive. For example, comparison of self-exposure instruction from a psychiatrist, a self-help book, or a computer showed that phobic individuals assigned to any one of these three groups improved (Ghesh and Marks 1987). The book used in this program included detailed instructions. It is difficult for people to clearly identify what they did to achieve change. They often attribute changes in their behavior (such as stopping smoking) to "will power." It is often difficult to convince readers to comply with suggested procedures for self-change. Certain kinds of individuals are more likely than others to profit from self-help formats (see, for example, Kivlighan and Shapiro 1987). We know that there are different kinds of self-change goals; some are given a higher status than others (Carver and Scheier 1986). People differ in their repertoire of self-change skills and in their history of using them to attain valued outcomes. Research on self-management and self-instruction suggests that some methods and formats are more likely than others to facilitate self-help. To what extent do self-help books build on this knowledge about self-management.

Questions to Ask

Are expected outcomes clearly described?

Vague descriptions of outcomes (e.g., increased self-actualization) have a number of disadvantages, including difficulty in planning how to attain them and in evaluating progress (see Table 1).

Who is (and who is not) likely to benefit? Who may be harmed?

Readers should ask: Is this book likely to help me? What evidence is given that it will help me? Have any experimental studies been conducted in which people are randomly assigned to different groups, including a control group composed of individuals who do not have access to the self-help material? If so, what are the results? Do all people benefit, or just some? How long do gains last? Who is most likely to benefit? Has anyone been harmed? Was the book itself tested under the same conditions readers will be using it? Often only testimonials are offered or the presumed expertise of the author is used to buttress claims made. Views about what has been

TABLE 1

A Consumer's Checklist
Questions to Ask About Self-Help Books

- Are expected outcomes clearly described (what/where/how long will they last)?
- What evidence is there that the book is helpful for people like me? How credible is this information? (Are the results of experimental studies reported?) What is the success rate? What is the failure rate? Are there any potential negative effects of the program? What are they? How long will gains be maintained?
- Will this book help me to develop accurate beliefs about self-change?
- Will this book help me to acquire accurate information about outcomes or problems of interest?
- Will this book help me to accurately identify problems?
- Will this book help me to clearly define my goals and and to identify changes required to achieve these goals?
- Are guidelines provided to help me assess my current knowledge and skills?
- Will this book help me to select effective self-change methods?
- Are guidelines for evaluating progress provided?
- Are the instruction formats used the most likely to be effective?
- Are effective methods described that will help me to carry out needed tasks (that will "motivate me")?
- Does the book describe how I can generalize and maintain positive outcomes?
- Are troubleshooting aids included to help me if I get stuck?

helpful may not reflect what is actually the case. Research in psychotherapy as well as in social psychology indicates that we do not necessarily accurately perceive or report the degree of change (see, for example, Nisbett and Ross 1980; Schnelle 1974). Consumer satisfaction ratings are often quite high (Lebow 1983) whether or not people gained what they originally sought from counseling (Zilbergeld 1983).

Many people do not understand what science is and what it is not (Miller 1987) and do not have the critical-thinking skills required to accurately assess claims. They will accept claims based on pseudoscience as readily as those based on science (Bunge 1984).

Will this book help me to develop accurate beliefs about self-change?

People have beliefs about self-change—what it is, what it requires, and what ethical and moral prescriptions relate to it in terms of responsibility. Many people believe that they can change by using will power. Belief in will power for overcoming common problems, such as shyness, smoking,

"The focus on self-help obscures the role of political, social, and economic factors that influence most of the behaviors that individuals try to alter through self-change."

and fear of flying, is widespread (Knapp and Delprato 1980). (For a review of lay theories, see Furnham 1987). Does the book discuss personal beliefs about self-change and help readers to acquire accurate beliefs based on research about self-change?

Will this book increase (or decrease) accurate information about topics addressed?

Does the book offer accurate information about an outcome or problem area of concern? Not all books offer accurate, up-to-date information. Rosenthal and Yalem (1985), for example, found that suicide-prevention information presented in self-help books was not always accurate.

Will this book help me to accurately identify problems?

Errors in problem definition are one of the main sources of failure of all kinds of programs. The histories of medicine and psychiatry are replete with instances of inaccurate identification of problems and their causes, with resultant ineffective or iatrogenic results (e.g., Morgan 1983). Consider the example of someone with low self-worth who inaccurately believes that excess weight is the reason for this low self-worth. The entire focus of self-change in such a case would be misdirected. When weight is lost but the self is still viewed as unworthy, the person may feel even worse than before. Or consider people who believe that their difficulty in meeting others is due to poor personal appearance, when in fact it is because they are not actively seeking out promising social situations and initiating conversations. Here, too, the focus of change may be misdirected.

Rosen (1981:190) emphasized the importance of "self-diagnosis." One of the seven guidelines he has proposed for reviewers of self-help books is this: "Does the book provide a basis for self-diagnosis . . . and have the methods for self-diagnosis been evaluated to establish rates of false positives and false negatives." He points out that "there is not a single published study concerning the ability of individuals to self-diagnose a problem." Selection of specific behaviors to focus on may not become clear until further information is gathered, as described in the next sections.

Will this book help me to clearly define my goals and to identify the changes required to achieve them?

Readers approach self-help books with different goals. Some wish to alter a specific behavior, such as to stop smoking. Others have vague goals, such as becoming a better person. If clear rather than vague goals are pursued, attaining desired outcomes is more likely and progress can be carefully followed. Although readers may say that they received help from a particular book, unless outcomes are clearly described and progress monitored, the results are really unknown. A feeling of being helped may not be accompanied by a real change in behavior. People may feel better but not *be* better. In some cases this might be satisfactory (if nothing can be done to achieve desired outcomes). But what if desired outcomes could be

TABLE 2

Sources of Error in Making Judgments

Acquiring Information

- Attending to vivid (but uninformative or misleading) data.
- Seeking data that confirm expectations.
- Ignoring conflicting data.
- Mistaking correlation for causation.
- Overlooking environmental causes and focusing on dispositional (personal) characteristics (the fundamental attribution error).

Output

- Influence of choice of format.
- Wishful thinking (our preferences influence our view of events).
- The illusion of control (a feeling that one has control over events that are in fact uncertain).

Feedback

- Misperception of chance fluctuation.
- Attributing success to skill and failure to change.
- Hindsight bias

Sources: Nisbett and Ross 1980; Hogarth 1987.

attained? What if readers could have more than just a feeling (or belief) that desired outcomes have been achieved?

Another step in behavior change is identifying factors related to desired outcomes. Let's say that a woman reads a self-help book designed to increase enjoyable social contacts. Does it give guidelines that help her to clearly understand why her current contacts are not satisfactory. Possible reasons include a lack of skills, a fear of negative evaluation, social anxiety, unrealistic expectations, poor self-management, and environmental obstacles. Errors often occur when making judgments about the causes of behavior. These include mistaking correlation for causation and overlooking environmental causes (Nisbett and Ross 1980). Other sources of error are noted in Table 2.

Are guidelines provided to help me assess my current knowledge and skills?

People differ in their repertoires of self-change skills. For example, some readers may know how to set clear goals. Some may already know how to rearrange consequences related to changes of interest. To what extent does a book help each reader to take advantage of skills he or she already has?

Will this book help me to select effective self-change methods?

The data gathered during assessment or "self-diagnosis" are used to plan intervention programs. According to the extent to which data are informative (reduce uncertainty about how to attain valued outcomes) and assumptions about causes are sound, wise

decisions are likely to be made. Inaccurate data and assumptions may result in incorrect choices.

What self-management skills are required? There are two major kinds of self-management. One involves the rearrangement of antecedents related to behaviors of interest. This is known as stimulus control. For example, environmental stimuli that encourage unwanted behavior can be removed or reduced in vividness, and those that encourage desired behaviors can be increased. Stimulus control is used to achieve a wide variety of outcomes (see, for example, Stuart 1977; Kanfer and Schefft 1988; Meyer and Evans 1989; Watson and Tharp 1989). A second kind of self-management involves rearrangement of consequences. Positive consequences are provided for behaviors we would like to encourage, and punishing consequences are removed. Negative consequences may be provided for unwanted behaviors, and positive consequences that usually follow such behaviors may be withheld.

Are guidelines for evaluating progress provided?

Feedback about progress can help to maintain change. Some desired outcomes are clear: stopping smoking, for example. Others are vague, such as communicating better with others. What would people do if they did communicate better? It could be argued that fuzzy goals have an advantage in that any positive change will be of value. For example, Zilbergeld (1983) points out that many people are glad they have seen a counselor and feel better even though they didn't get what they came for. Perhaps this is the reason consumer satisfaction is so high in outpatient mental-health agencies (Lebow 1983). However, perhaps these clients would be even more satisfied if their original complaints were also removed. Does a self-help book help readers to identify clear, personally relevant progress indicators, motivate readers to track these on an ongoing basis, and provide effective instructions about what to do depending on progress found?

Are the instructional formats used the most likely to result in success?

A good deal of research is available that has investigated the effectiveness of different kinds of instructional formats. This indicates that some are more effective than others (Gagne 1987). Instructional formats that include clear description of desired outcomes, intermediate steps, and entering repertoires (knowledge and skills initially available) and use model presentation, coaching, and rehearsal are more likely to be effective compared with programs that do not have these characteristics. Successful self-help programs for anxiety reduction include a detailed manual and a specially designed diary to record tasks completed and progress made (see Marks 1987). Detailed instructions are given about how to: (1) identify target problems, (2) practice self-exposure to anxiety-provoking events, (3) keep records of tasks performed and track reduction in anxiety in diaries, (4) anticipate and deal with setbacks, and (5) involve significant others if feasible.

Are motivational guidelines presented?

Although prescriptive advice offers guidelines (which may be more or less clear) about what to do, it does not provide the motivation to act on this advice. For example, knowledge about helpful rules does not provide the motivation to act on these rules

(Hayes 1989; Skinner 1987). It would be quite a different world if this were the case. Not carrying out instructions is a common problem in self-change programs (Rosen 1981). Review of self-exposure treatment for anxiety indicates that brief initial contact with a counselor is an important motivator for some individuals (Marks 1987).

Motivation is largely a matter of arranging cues and contingencies of reinforcement to support desired changes. A contingency is a relationship between behavior and the environment. Smoking cigarettes may be followed by pleasurable feelings of relaxation. Altering contingencies involves rearranging the environment. Questions here are: (1) Are consequences of concern under a client's control? (2) Does the client have the skills required to rearrange these? (3) Are there competing contingencies that will interfere with success? and (4) Can these be removed or muted? Many self-help books rely on exhortation to motivate readers; that is, they encourage them to "do it." Exhortation is notoriously ineffective.

Are guidelines presented for generalizing and maintaining gains?

To what extent will new behaviors occur in different situations? Will gains be durable? Generalization and maintenance are major problems in change programs—both self-help and counselor-based (Marlatt and Gordon 1985; Stokes and Osnes 1989).

Are troubleshooting guidelines included?

Self-help books require readers to use material "on their own." Errors may occur at many points and may compromise hoped-for results. Troubleshooting guidelines should be included at relevant points to address obstacles that may arise.

Summing Up

The popularity of self-help books cannot be understood without a historical understanding of the transformation of the term *soul* into *mind* and now into *self*. The self is thus almost a holy concept, a reverential one. This is one reason that efforts to point out the limits of self-change and self-managment are strenuously resisted even though they would increase understanding of real sources of influence and consequent potential to exert counter-control against unwanted influences (e.g., Skinner 1971). Self-help books should take advantage of what is known about self-change. Research that bears on self-change does not so much question the possibility of self-change, but points to a different set of factors that will help in the attainment of desired outcomes.

Limitations of self-help books include: inadequate or misleading guidelines for self-assessment; lack of guidelines about how to monitor the degree of compliance with programs and to increase compliance as needed; and lack of guidelines for selecting intervention programs uniquely suited for each reader and for monitoring progress. Few guidelines are described for "troubleshooting" (what to do if there is no progress/no compliance, etc.). Few, if any, guidelines are provided to encourage generalization and maintenance. One of the greatest deficiencies of self-help books is their ignoring environmental variables that influence behavior and not providing guidelines to readers about how to alter the environment to achieve desired outcomes.

Many people benefit from advocating self-help as a panacea for physical and psychological maladies. Millions of

dollars are made by publishing companies and bookstores each year from the sale of self-help books. Only if earlier books are not successful in fulfilling readers' goals will new books be purchased that promise greater success. The change process and the factors related to it remain mystified as readers turn to the self-help book displays in search of the latest self-help guide—*this* one is bound to work.

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Anybody Listening?

"I have only one redeeming thing to say. I'd rather listen to a president that listens to pollsters than to one that listens to astrologers."

—House Rules Chairman John Moakley, reacting January 29, 1992, to President Bush's State of the Union speech the night before (*Congress Daily*, Jan. 29, 1992)

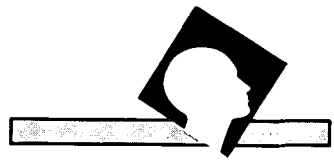
Ghost Lights Of Texas

HERBERT LINDEE

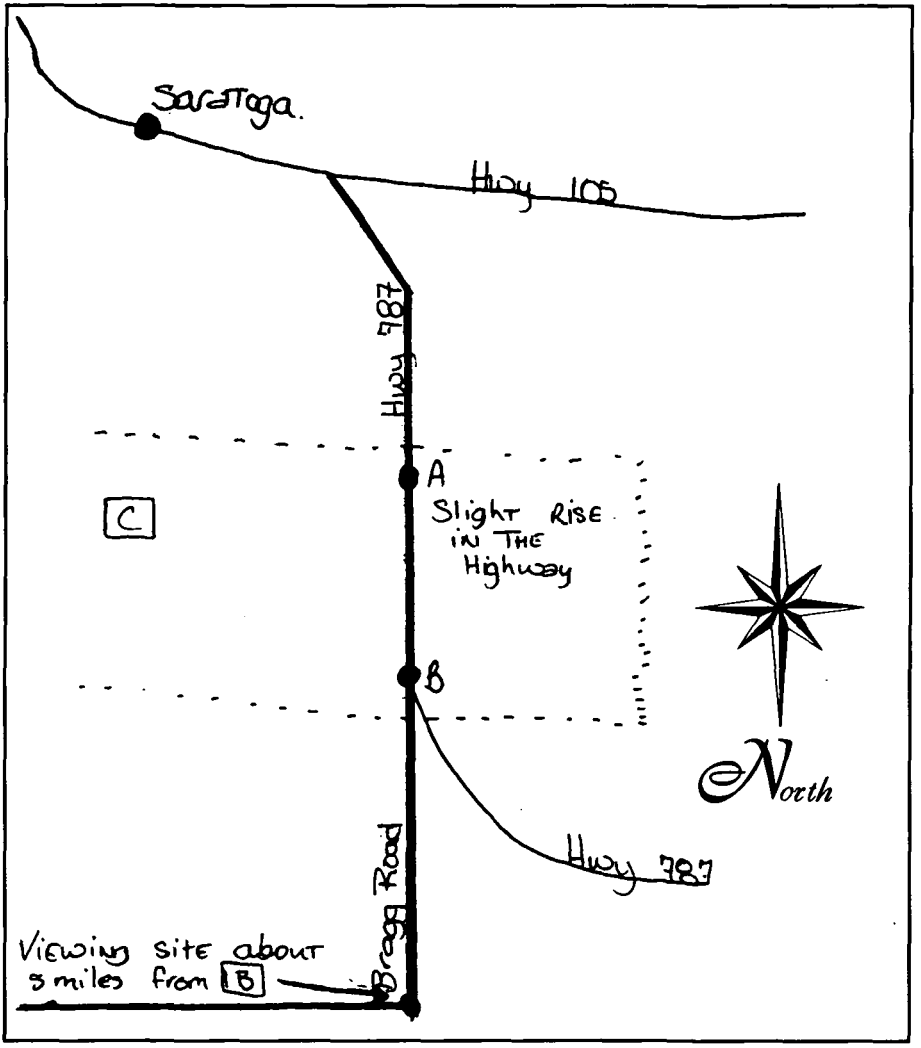
Like many other places, Texas has its share of reported ghost lights. The two best-known ghost lights in the state are at Saratoga and at Marfa. We at the Houston Association for Scientific Thinking (HAST) have seen both and have found simple causes for both. Explanations offered for the Saratoga and Marfa

lights have included luminescence from human ghosts, swamp gas, Satan, UFOs, campfires seen from far away, piezoelectricity, mirages caused by temperature inversion, St. Elmo's Fire, ball lightning, the moon's reflection in water pools, the glow from bat guano phosphates, and phosphorescence from mineral deposits. Although simple logic dictates that there may indeed be more than one source of energy that produces strangely visible luminescence, there is strong evidence that what most tourists take to be ghost lights outside of these Texas cities is a phenomenon of no more subtlety than car headlights seen along a highway quite a bit farther away than the distance one normally encounters when perceiving such objects.

Saratoga is a small town in the East Texas

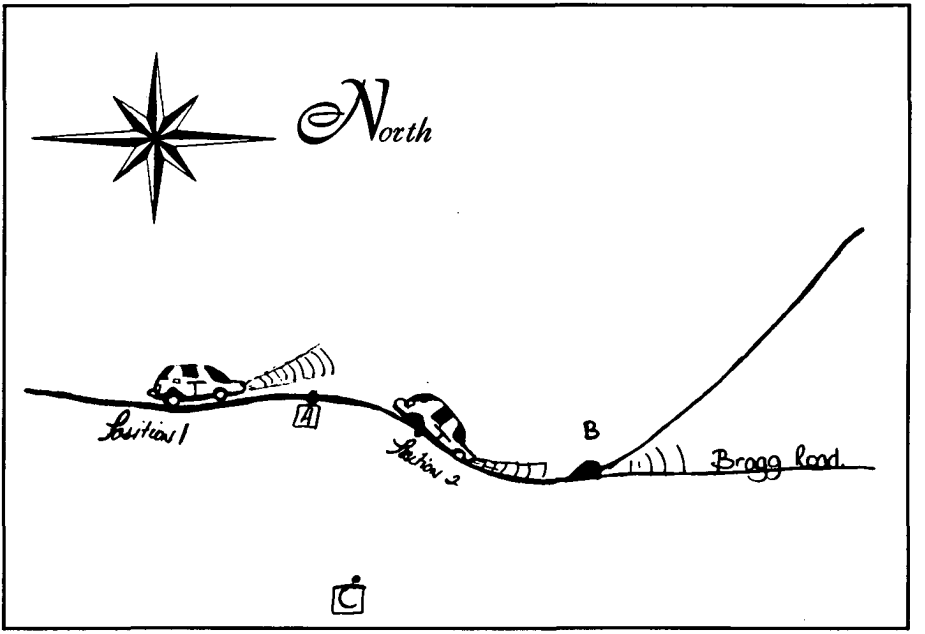


The Saratoga and Marfa lights can look impressive and mysterious. Here is what causes them.



Map 1: Looking approximately south. (See Map 2, of dotted section.) Point C is a reference point. At point A, a car headed north comes over the rise. The lights then shine into the tunnel of trees formed along Bragg Road. Cars from B to A present a slight red glow with their taillights.

piney woods, a part of the Big Thicket, an ecological treasure whose name aptly describes its plant growth. Local legends claim the lights have been seen there since the times of the early Native Americans. Near Saratoga, stretching seven miles across the forest floor, is Bragg Road, an arrow-straight former railroad bed about seven miles long. (See map.) The growth of the trees above it and the thicket beside it create a tunnel of vegetation as one peers down the roadway in the darkness of night. At night, if you travel five miles north into the tunnel and then look back, you can see the lights from the cars as they round the curve on Highway 787 (see diagram). To the naked eye, from such a great distance the two



Map 2: Dotted section of Map 1, looking approximately west. At Position 1, the car's headlights do not enter the tunnel of trees along Bragg Road. At Position 2, the car's headlights are suddenly directed full force along Bragg Road.

headlights appear to be one bright motionless spot in the middle of the tunnel. The bright spot appears in the exact middle of the tunnel for a short time, then suddenly disappears until the light from another car takes its place. The duration of the phenomenon varies with the speed of the cars as they travel along 787. A time-exposure photo of the Saratoga light can be seen on page 528 of the October 1974 *National Geographic*. The actual experience is eerier than the photo.

The slight rise in Highway 787 as a northbound car reaches the point at which its lights shine into the tunnel of trees produces a startling effect that contributes to the eeriness of the phenomenon. On a dark night along a straight highway, the light from an approaching car expands from a small dot until the first car is close enough for a person to observe two bright lights. But cars traveling on 787 to the tunnel of trees formed by Bragg Road do something quite different. As the car approaches, the headlights are first directed upward into the sky above the tunnel of trees. When the car slips over the rise, about 60 to 100 yards from Bragg Road, the headlights suddenly are directed into the tunnel harboring Bragg Road. The viewer is rewarded with first a slight glow and then a sudden dramatic burst of light instead of the slow buildup one might expect along a stretch of straight highway. The lights do not appear to be the familiar lights of oncoming traffic, so they are often interpreted as mysterious.

This is what most watchers see as the Saratoga lights. We have been there four times. On all four occasions all participants saw the same thing with the naked eye, first a glow then a bright spot in the middle of the tunnel that appears suddenly, stays a short time, then disappears just as suddenly. Looking through binoculars

or through a good terrestrial telescope unmasks the mystery, for then one can see the single light separate into two car headlights. If the lights are exceptionally bright, one can even make out the license-plate holder on the front of the car.

Those with better eyesight say they can sometimes see a change of color in the light. This occurs if a car traveling south toward Saratoga appears in the viewing window just as one traveling north, away from Saratoga, exits the viewing window. The tail-lights of the southbound car replace the image of the white lights of the northbound car. It is quite a remarkable exhibition even when the cause is well understood.

Local residents seem willing to perpetuate this phenomenon as a mystery, for it brings in a considerable amount of tourism throughout the year. To their credit, they do not lie when asked about the lights. They either do not respond to questions, or they say something like, "Who knows what it might be?"

Another indicator of the true nature of the lights is the protest the town of Saratoga lodged a short time ago against the cutting of the trees along the road for forest management. Any destruction of that tunnel of trees might hinder the ability of the light to travel uncontaminated by other light sources along that five miles of dirt road directly to the viewer's eye. That would change the reputation of the Saratoga lights.

An interesting point arose on our first visit when we talked to the young man minding the local museum, one of the most interesting local museums in the state of Texas. He said he had never seen the lights because he had been on Bragg Road only in the summer to collect plants, and the lights seemed to be a winter phenomenon. We assumed he meant he collected plants till darkness, then drove home. We surmised this is more a winter phenomenon because the heavy summer foliage filters out the light. To check this out, John Chalmers, HAST's vice-president, and I journeyed to Saratoga on July 29, 1991. The night was slightly hazy. We could see some stars, but it was not the clear night-sky background that our groups had had on previous expeditions. As we drove to Bragg Road, car lights along Highway 105, which intersects with 787, looked fuzzy when they were far away.

We entered Bragg Road after dark and stopped to look back toward 787 at one-mile intervals. After about two miles the phenomenon became less impressive. Something was filtering out the light from the cars along 787. By the time we were four miles in, we could only faintly see the lights that appeared at the end of the tunnel. The difference between these lights and the ones seen in the winter was like the difference between the light from a very powerful flashlight and that from a small penlight. We believe the cause of this dimming to be the filtering effect of the leaves that now covered the branches around the tunnel. It is also possible that the higher humidity of the summer might have some dimming effect on the light.

We saw far fewer occurrences of the lights than one does in winter. Two things could cause this. First, darkness occurs much earlier in winter than in summer. Second, our other visits were on weekend nights, when people are out doing the things they do on Friday or Saturday evenings. The traffic on a winter weekend night at six o'clock would be expected to be much heavier than that of a summer weekday night at nine o'clock.

After our excursions to the Sara-

toga lights, the Marfa lights in West Texas promised to offer something special. Persistent rumor claims that there is no roadway where the Marfa lights are seen. I visited Marfa during spring break of 1991 and found, to my great surprise, a highway running north-south from Marfa to Presidio exactly where the lights tend to be seen. (See map.) The viewing site is on Highway 90 some nine miles east of Marfa. Some people claim that records of the Marfa lights go back to the 1880s, when ranchers first reported seeing them. I visited the viewing site three nights in a row. Each night I stayed three hours, a total of nine hours of viewing time. On each of those nights close to 50 other tourists appeared at one time or another to watch the lights.

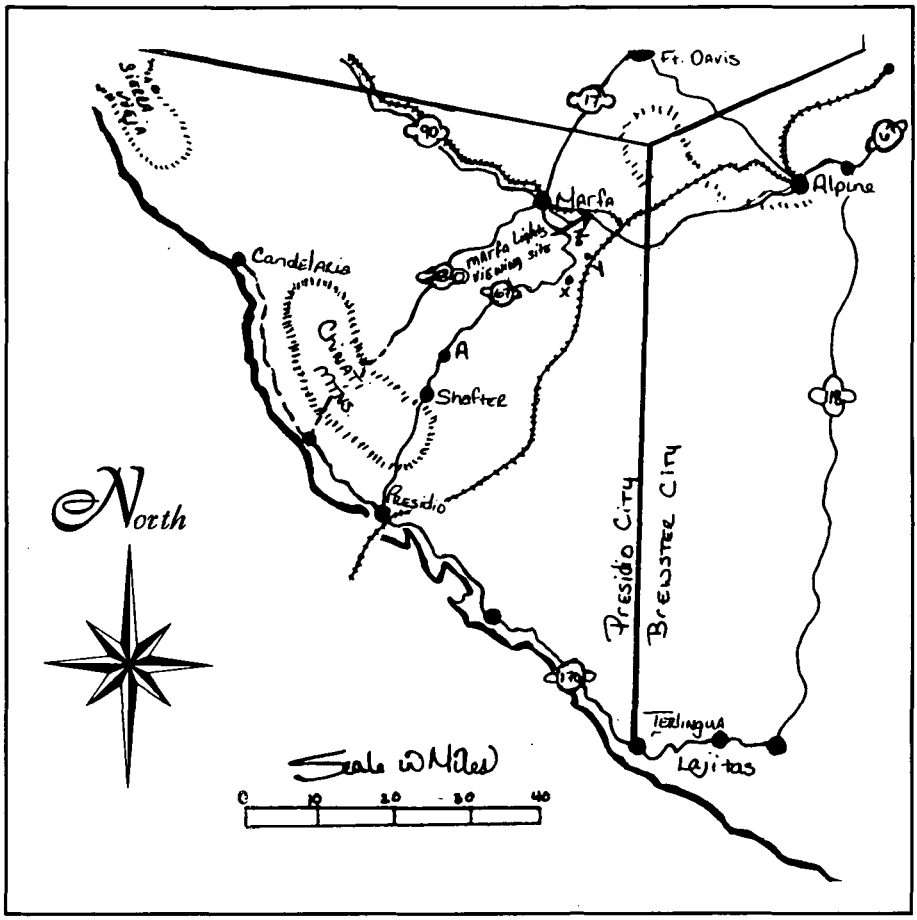
The first night there was complete agreement among those I talked to that the lights we were seeing were cars headed north from Presidio to Marfa on Highway 67. We would see the headlights as they came to high spots in the road and would see them disappear as the road went behind a cut or into a valley. Because the viewing distance is about 30 miles, no movement is seen, and not even good binoculars can separate the single light we see with the naked eye into two car headlights. Nightly one can also see three quite clear stationary lights—one red, one bluish-green, the other a bright white—that are unquestionably man-made, and these came into play the last day of the investigation.

The second night fewer viewers knew of the highway to Presidio, and one or two maintained they were seeing magic lights. On the third day I decided to look at the lay of the land along Highway 67. I traveled in late afternoon from Marfa into the Chinati Mountains to Shafter, some 40 miles up the road. I turned around and came to a point on the inner rim of the Chinati Mountains from which one can see the entire basin in which Marfa lies. There I waited until darkness fell. I could see car lights all along the road to Marfa, except where the bends and cuts obscured them, and I could see the lights of Marfa itself nestled at the end of this well-lit trail. I could also see the three different-colored stationary lights we had seen at the viewing site, and I made a mental note of their positions relative to Highway 67 as I traveled it north back to Marfa.

To get the straight-line distance from these mountains to the viewing point on Highway 90, I measured the distance along Highway 67 to Marfa from the point on the inner rim. Using this distance (which was only approximately straight) with the distance from Marfa to the viewing site, and slipping in a bit of Pythagoras, gave a distance of about 30 miles from the viewing site to the place on the rim where I waited for darkness.

At the viewing site I related the position of the stationary lights visible there to the stationary lights I saw appearing and disappearing as I drove north along Highway 67. The positions of these lights were exactly where they should have been relative to where the stationary lights had been on the trip northward along 67. The stationary lights that had been east of the highway and north of the point on the rim where I waited were now both east and north of the lights we saw as the Marfa lights.

Reports of the Marfa lights are more spectacular than those of the lights of Saratoga, and in truth the display at Marfa is more impressive. People at both places report sightings whose accoutrements resemble those associated with ball lightning, but ball lightning is something associated with electrical storms and is not peculiar



to either Marfa or Saratoga, so that it does not enter as anything special to just those places. However, a careful look about the Marfa area produced some ideas about the Marfa lights that are pure speculation.

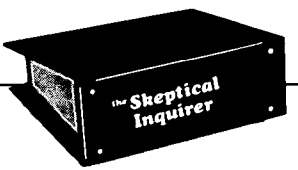
As I drove into the Chinati Mountains toward dusk on the third day, I noticed a small, dark-colored plane circling the area near the mountains. This region is close to the border with Mexico, and the swooping plane evoked fantasies about smugglers or illegal immigrants. If the plane's lights were on at night they might be seen as easily as those of a car along the road, and perhaps the plane's movements in a random pattern could be taken for just about anything from a ghost light to a UFO.

The geography around Marfa enhances the feeling of mystery and the majesty of its lights. Our vision sweeps across the basin to the mountains miles away, and we see lights blinking on and off as cars slip between the open spaces into sheltering cuts or valleys. The horizon is far away, and we feel the vastness of the basin in which Marfa lies. The prosaic stationary lights remind us that the winking lights could be something much more ordinary than a simple human artifact. We must not forget

that the entrancement of seeing the lights is not diminished by any realistic explanation of them. The experience is mildly mystical, and it is this that keeps the crowds coming again and again.

A reminder that caution must be taken. Because what we saw for four nights in Saratoga and three nights in Marfa did not go out of the bounds of the ordinary does not mean that the extraordinary has never occurred in either place. I think we sometimes forget that skepticism must be open-ended. I do not think that anyone will ever see at Marfa or at Saratoga anything not explainable by natural or man-made causes, but too many skeptics think the door is shut when it should always be slightly ajar.

Herbert Lindee is president of the Houston Association for Scientific Thinking.



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Book Reviews

Fallacies and Factors in New Age Thinking

Thinking Critically About New Age Ideas. By William D. Gray. Wadsworth Publishing Co., Belmont, Calif., 1991. 164 pp. Paper, $15.95.

MARK W. DURM

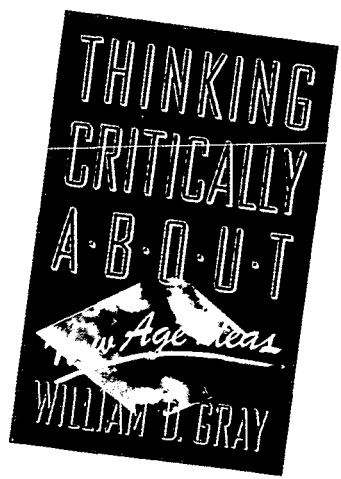
Critical thinking is the reasoning we do in order to determine whether a claim is true. This is a process we can do poorly or splendidly. Because our conclusions are only as sound as our reasoning process, critical thinking is not a luxury but a necessity if we are serious about discovering the truth. The clear advantage to studying critical thinking, then, is that we become better able to sort out fact from fiction.

The quotation above begins this well-written and timely book by William D. Gray. Gray began his study of "New Age" phenomena because of the interest shown in them by his philosophy students at Southwestern College. His concern grew as he realized his students *accepted* these ideas without any critical evaluation. (I, too, became concerned at the college I teach, for this very same reason. As a result, I initiated and now teach a course entitled "Skeptical Thinking.")

Even though the book is concise, its intensity and breadth of topics is substantial. Yet it is written nontechnically. Gray presupposes no special background from his reader and so the text is applicable in a wide variety of situations.

The author uses "language" as his starting point and proceeds to relate four basic principles of human language: (1) language is a human product; (2) whatever meaning a word has is due to the use that humans put it to; (3) the meaning of a word is arbitrary; and (4) in order for there to be symbolic communication between people, there must be agreement on the use of those symbols.

The importance of these principles cannot be overemphasized when one realizes that "linguistic superstition"



is used by many New Age proponents. Linguistic superstition, as Gray describes, is when a word is treated as if it has a power of its own, independent of human agency. Thus mantras, chants, magical words, and even new words are touted by New Age thinkers. Furthermore, Gray writes of how the New Age thinkers deal in metaphysical terms. The paranormalists love to discuss such concepts as *astral plane, another dimension, inward journey, vibes,* and others. This passion for "beyond the physical" terminology is seen in many New Age publications. Even though these paranormal "scientists" contend that they are searching for the "truth," they use terms that cannot be empirically tested. As Gray writes, "If no observations can refute a statement, no observations can confirm it either."

A powerful section of the book is entitled "Common Fallacies." *Fallacy* is defined as a defective argument in which the premises do not support the conclusion. Gray lists several of these fallacies, of which a few are listed below using his examples:

> *Ad Hominem (attack the person).* Example: "James Randi says that ——— is a charlatan. But only a fool would listen, because he's an atheist."
>
> *Appeal to Ignorance.* Example: "Ghosts must exist at the Smurl house in West Pittston, because skeptics have never proved that they don't."
>
> *Appeal to Authority.* Example: "Channeling is real, because Shirley MacLaine talks about her numerous experiences with channeling in her book."

The author skillfully, and in a very understandable way, confronts some paranormal phenomena—the Bermuda Triangle, precognition, time travel, and others. In so doing Gray explains the *Fallacy of Affirming a Logical Impossibility,* the *Fallacy of Demanding Proof of a Negative,* and *Hume's Scale* (asking if a paranormal event really occurred or if a human being has bent the facts).

He lists three factors that contribute to belief in the paranormal: (1) a popular philosophy, (2) environmental influences, and (3) psychological tendencies that promote fallacious reasoning.

The popular-philosophy concept centers around a number of beliefs that encourage adherence to the paranormal. Such beliefs as "Scientists don't know everything," "There are things we just can't know," and "The mind is a mysterious entity and we do not know its limits" provide the basis for an easy acceptance of paranormal premises.

The second factor, environmental influences, is a very strong one due to the belief, as Gray writes, that they are largely outside our control. He lists the media, misinformation, and ignorance as examples. The media are quick to relate paranormal stories and extraordinary claims because of the public's interest. We are excited about the abnormal, not the normal. We hear and see reports of psychics, ghosts, and UFOs, just to name a few. However, whenever the story turns out to be a hoax, the media do not give it as much attention. Misinformation is rampant in our society. We easily fall prey to myths because we lack critical-thinking skills. The myth that we use only 10 percent of our brain is an excellent example. And, of course, ignorance—ignorance makes us gullible because we are unaware of natural explanations of "supernatural events." A perfect example of this is firewalking, which can easily be

explained by just knowing a few fundamental laws of physics.

Many people succumb to psychological tendencies, the third factor Gray lists for paranormal belief. The human tendency for enjoying exciting stories, thinking wishfully, having confidence in what we see and feel, and making a causal connection where none exists makes for naiveté, and naiveté underscores credulity.

Gray concludes by explaining the difference between science and pseudoscience and giving characteristics of each. Science is empirical and controlled and requires repeatability, testability, and compatibility with existing knowledge. Pseudoscience, on the other hand, is not empirical, is vulnerable to experimenter effects, is often not testable or repeatable, ignores falsifying data, and is often incompatible with existing knowledge. The two are simply not the same, much to the chagrin of paranormalists.

To sum up, Gray has written a very readable and informative work. He teaches readers to recognize fallacies and understand the tenets of true science.

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Adventures of a Skeptical Detective

Ambrose Bierce Is Missing, And Other Historical Mysteries. By Joe Nickell. Lexington, Ky.: University Press of Kentucky, 1992. 180 pp. Cloth, $22.00.

ROBERT A. BAKER

For the skeptical investigator, Joe Nickell's latest work, *Ambrose Bierce Is Missing*, is not only required reading but the quickest possible way to hone one's investigative skills. Into a relatively few pages not only has Nickell managed to pack the philosophy, strategy, and tactics of scholarly research and scientific investigation, but he also walks the reader, in step-by-step fashion, through nine separate and diverse historical mysteries he has confronted and solved.

Citing Heinrich Schliemann's uncovering of the Mycenae culture as one of the classic investigations of all time, Nickell goes on to show how, by varying one's approach, the clever inquirer can solve just about any conundrum that comes up. Drawing an interesting and useful distinction between "an investigation" and "research," Nickell notes: "While we 'research' the effects of smoking or the causes of economic growth, we 'investigate' a diversion of funds or a homicide. In short, the systematic seeking of knowledge is research, and the attempt to solve a specific mystery is an investigation." Then, beginning with "The Mystery of the Nazca Lines," as an example of an ancient riddle, Nickell succinctly reviews how archaeologists go about their business of uncovering the past. He follows this with eight additional case histories—each an illustrative example of a

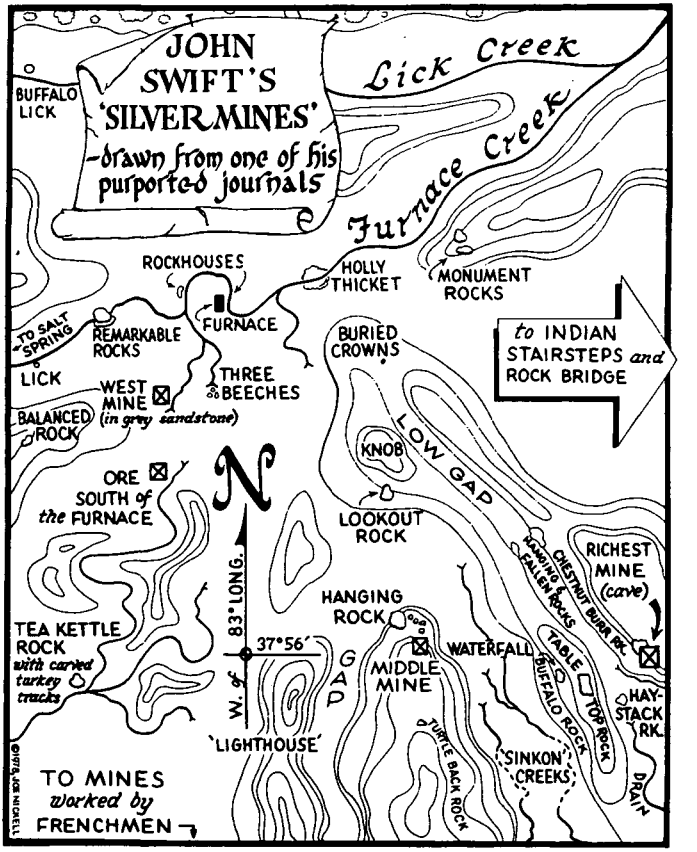
particular investigative strategy.

Approaching the problem of the Nazca lines from the point of view of the Nazca artists and engineers, Nickell was able to reproduce, i.e., duplicate, the giant condor drawing using only sticks and cords in a manner that the Nazcas probably used. There is no need to assume extraterrestrials were involved. If they were, Nickell notes, "one can only conclude that they seem to have used sticks and cord just as the Indians [and Nickell] did."

The title piece, "Ambrose Bierce Is Missing," serves as a classic example of how to deal with biographical enigmas. Citing Marchand's investigation of Byron, Griswold's and Quinn's study of Poe, and Goerner's attempt to put Amelia Earhart in the hands of the Japanese just before World War II to illustrate various ways of confusing legend with fact, Nickell uses a number of these approaches on the disappearance of Bierce. Bierce not only created mysterious disappearances in his stories but also became the subject of one himself. When Nickell's analysis is finished, there is little doubt about what happened to Bierce. Nickell's tracing of the various speculations and his revealing of their shortcomings is an exercise no dedicated skeptical student should miss.

Looking at folklore and its origins, Nickell studied the Eastern Kentucky legend of the fabled "lost silver mines" of one "Jonathan Swift." This tale is an excellent example of "fakelore," i.e., a falsification of folkloric data via "invention, selection, fabrication, and similar refining processes." Some of the world's great legends, e.g., Noah's Ark, Atlantis, and the Gilgamesh epic, fall into this category. Swift, supposedly preceding Daniel Boone into the wilderness, made annual trips into Kentucky from Alexandria, Virginia, to mine silver. From 1760 to 1769 Swift successfully mined his silver until illness, mutiny, and other dangers made him wall up his treasure-filled mine. When the fabled miner, now blind, returned some 15 years later to recover his hoard, he was unable to find the mine. Approaching this tale from a scientific perspective, Nickell quickly discovered that: (1) silver exists only in trace amounts in eastern Kentucky; (2) a number of spurious Swift "journals" exist; (3) false documents and fake Swift signatures, as well as fraudulent genealogies, were also uncovered; and (4) no evidence could be found that this particular "Jonathan Swift" had ever existed. To put the final nail in the coffin lid, Nickell and his father reconstructed Swift's map and followed his directions across the Kentucky terrain to nowhere. Over the years this "fakelore" cost several people their health and fortunes and was also the direct cause of at least one homicide.

In the search for the lost silver mine a number of artifacts turned up that the finders claimed must have belonged to the great Daniel Boone himself. As the years went by more and more Boone artifacts emerged—rifles, knives, huts, carvings, and so on. With the help of John Fischer, Nickell applied his detective skills to a number of these relics and cleverly exposed hoax after hoax. In similar fashion, Nickell also examined a number of suspect documents and, over the years, has quietly built himself a reputation as one of the nation's few forgery experts. (Most of Nickell's work in this area appears in his recent book *Pen, Ink and Evidence* [University Press of Kentucky, 1990].) Exactly how one uses one's investigative skills to determine a document's authenticity is shown clearly in Chapter 7, Nickell's study of Lincoln's famous letter to Mrs. Bixby on the



Map reconstructed from purported journal description shows supposed location of John Swift's lost silver mines. (Drawing by author.)

death of her sons. Here the issue regarding the letter's authenticity is unquestionably resolved.

Other chapters include the investigation of lost textual material and missing editions of books, the tracking down of lost, incomplete, biased, or spurious resources and, of most interest to skeptics familiar with the author's *Inquest on the Shroud of Turin* (Prometheus, 1987), a chapter summarizing and updating the techniques used to establish that the famed Shroud is *not* the burial cloth of Jesus.

In a short afterword, "Some Lessons Learned," Nickell reviews other investigative techniques and methodologies and notes in conclusion: "Investigators of whatever variety share a belief that mysteries invite solution, that appropriate methods can be an attainable goal, and that a changed—presumably better—view is the ultimate result" (p. 155).

Although Nickell calls these investigations "historical" ones it is important to remember that most—if not all—investigations are after-the-fact and thus are "historical." This fact in no way diminishes the value of the methods and techniques for the skeptical investigator in search of solutions. *Ambrose Bierce Is Missing* is a clear, concise, highly readable and entertaining addition to the skeptic's armamentarium. As a dogged, deter-

mined, dedicated, and undaunted detective, Joe Nickell is, without a doubt, surpassed only by Sherlock Holmes, Sam Spade, Spenser, and the indefatigable Columbo. Let us hope his peeking, probing, and prying into the realm of the hidden, the mysterious, the secret, the supernatural, and the unknown will never end.

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Is the Big Bang a Bust?

The Big Bang Never Happened: A Startling Refutation of the Dominant Theory of the Origin of the Universe. By Eric Lerner, New York: Random House, 1991. 466 pp. Cloth, $21.95.

VICTOR J. STENGER

Normally the refutation of a dominant scientific theory takes place on the pages of a scientific journal. But strange things are happening in science these days, as a Nobel laureate admits to publishing falsified data, great research universities are accused of misspending, and wacky claims like cold fusion are announced by press conference. News magazines proclaim that science is in trouble, so it must be so. The scientific establishment has been smug and complacent for too long. It's high time it was pulled down from its pedestal and told who's boss in a democratic society.

The big-bang theory is the standard framework within which most cosmologists operate, having assumed the same position held by evolution for biologists and quantum mechanics for physicists. Eric Lerner wishes to pull down not only that framework but also what he perceives as the outdated mentality that built it.

Lerner's case against the big bang is composed of several different lines of argument. The first is conventional scientific criticism: The big-bang conjecture is said to be invalidated by the data. Cosmologists have a theory, the big bang, that makes specific quantitative and qualitative predictions that are tested against observations. They claim success for a significant majority of these tests, far exceeding all alternatives. The recent highly publicized results from the Cosmic Background Explorer (COBE) satellite provide further evidence for the validity of the big-bang model. While admitting that a detailed, satisfactory explanation of several phenomena, notably large-scale structure formation, is yet to be provided, big-bang cosmologists do not see this as fatal. Lerner, however, argues that these deficiencies are so severe as to invalidate the whole notion of a universe finite in time and space.

The big bang may be wrong, but Lerner can't seriously expect to prove it in a popular book. The issue is hardly likely to be settled without the technical detail, careful reasoning, and expert critical review of the conventional scientific paper or monograph,

which this is not. Lerner attempts to go over the heads of cosmologists to the general public. Despite current criticism of science, I see no sign that the public is demanding suffrage in the determination of scientific truth.

The author does not limit himself to a scientific critique of big-bang cosmology, but has a larger agenda. His goal is to refute not just the big bang but the very thought processes of conventional science as well. He argues that the hypothesis-testing procedure is a throwback to Platonism, a product of theological rather than scientific thinking and antithetic to the essence of the scientific revolution.

According to the author, the equations used in big-bang calculations are treated by the science elite as the ultimate reality of the universe—like Plato's forms. Even after these equations are shown to disagree with observational facts, as Lerner claims they have been, they are retained by big-bangers because of an irrational prejudice that the theory must be correct regardless of the facts. Rather than discard the big-bang theory, cosmologists invent new unobserved phenomena, such as cosmic strings and invisible dark matter, to "save the phenomena."

The big bang is promoted, in Lerner's view, because science has sacrificed its soul to theology. The theory confirms the theological notion of creation *ex nihilo:* The universe is finite, having a definite beginning, created with a fixed design, and gradually winding down under the inexorable effect of the second law of thermodynamics.

Lerner argues that this picture disintegrates on exposure to observed facts, not just those gathered with telescopes but common experience as well. From everyday observations, the universe is growing and evolving to a state of increasing order. The second law is simply wrong, or wrongfully interpreted.

The curved space and black holes predicted by general relativity are likewise not common experience, but the result of abstruse mathematics. Lerner says we should believe what our eyes tell us, not some fashionable mathematical equation.

Finally, Lerner finds within this cosmotheological conspiracy the source of most of the evils of society. The slavery of the past and the continued authoritarianism of the present somehow arise from the idea that the universe came into being at an explosive instant and is headed toward ultimate decay. He says the big bang is a convenient paradigm employed by an unholy alliance between church and state to subjugate humanity. In their view, the material world came from nothing and is next to nothing, transient and meaningless in the face of the eternal, limitless power of God.

Lerner's alternative universe is based on the matter-antimatter symmetric plasma cosmology promoted for years by Nobel laureate Hannes Alfvén. Most conventional cosmologists insist that plasma cosmology is inconsistent with observational data. In particular, Alfvén's universe is half matter and half antimatter; yet no more than one part in a billion of antimatter is observed anywhere in the universe.

What arguments does Lerner use to promote the plasma universe? Again they fall into the same classes as his arguments against the big bang. And they possess the same flaws he purports to find in conventional cosmological argument.

While castigating big-bang cosmologists for using hypothesis-testing, Lerner is not beyond claiming successful tests of the hypotheses of plasma

cosmology. While maligning big-bangers for inventing new ad-hoc entities, such as the dark matter, to "save the phenomena," he introduces unobserved, invisible "filaments" throughout the universe to scatter the microwave background and make it isotropic as the data require. (The big bang requires nothing ad hoc here, and, in fact, *predicted* the microwave background.) While he derides the mathematical equations of general relativity for being inferred from arguments of symmetry and elegance, rather than directly from experiment, Lerner extols the marvels of Maxwell's equations of electromagnetism—also inferred as much from arguments of symmetry and elegance as from observation. And while he criticizes the theological nature of creation *ex nihilo*, he calls on the equally mystical ideas of Teilhard de Chardin.

Has Eric Lerner punctured the big-bang balloon so that its collapse is at hand? I doubt it. The big-bang theory is in no more trouble than the theory of evolution. Creationists tried and failed to invalidate evolution by trumpeting a few of the problems biologists still argue over. Similarly, Lerner tries and fails to invalidate the big bang by drawing attention to its current unsolved problems, declaring them fatal while ignoring the theory's many successes, unmatched by any alternative theory.

The first successful test of the big bang occurred with the discovery of the microwave background in 1964. Lerner dismisses this prediction, labeling it a failure because the measured temperature of the radiation was lower than predicted. But the important result was that the radiation was there at all. No other theory, including plasma cosmology, foresaw this. Lerner's argument is like someone saying that Columbus failed to prove the earth was round since he set foot in the Americas rather than the East Indies, where he had expected to land.

Lerner also argues that the universe must be much older than the 15 to 20 billion years required by standard big-bang theory. He claims that the large structures being observed by astronomers ". . . were just too big to have formed in the twenty billion years since the Big Bang" (p. 23). While current cosmology has yet to accommodate these structures, Lerner has not demonstrated that it never will within the big-bang framework. His calculation is based on the *lengths* of the structures, the longest being somewhat less than a billion light-years. In fact, only their *widths*, tens or hundreds times smaller, need to be explained. In a 15- to 20-billion-year-old universe, ample time exists to generate a structure a billion light-years long and a hundred million light-years wide. We just do not yet know the exact mechanism.

The fact is: No observation rules out the big-bang theory at this time. And the big-bang theory is successful in quantitatively explaining many observations. For example, calculations on the synthesis of light chemical elements in the big bang give remarkable agreement with measured abundances.

Lerner uses the kinds of arguments one often hears in a public discourse on science, but rarely among professional scientists themselves. For example, he argues that plasma cosmology is in closer agreement with everyday observation than big-bang cosmology, and hence is the more sensible. A look through a telescope reveals spirals and other structures similar to those observed in the plasma laboratory (and, as cosmologist Rocky Kolb has remarked, in your bathroom toilet as well). Following Lerner's line of reasoning, we would conclude, as

people once did, that the earth is flat, that the sun goes around the earth, and that species are immutable. The scientific revolution taught us to question commonsense expectations.

Finally, I want to comment on Lerner's connection of the big bang to the Judeo-Christian concept of Creation. I agree with the author in condemning the way the big bang has been exploited by preachers, popes, and some scientist-authors of popular books as providing an imagined link between science and religion, and even a verification of the existence of a Creator. We have seen this phenomenon repeated as the recent COBE results are trumpeted by the media as evidence for God's presence "shining through" in the design of the universe. These commentators do not understand that quite the opposite is the case. No support for creation by design can be found in the theory of the big bang.

Complete quantum chaos must have existed at an early moment of the big bang (the *Planck Time*, 10^{-43} second). All we know about the universe is consistent with a beginning that was a spontaneous quantum fluctuation, with structure and physical laws developing by the purely material processes of self-organization. The uncreated universe does not, as some people think, require a violation of the first or second law of thermodynamics, nor any other principle of physics.

Perhaps the big bang did not happen exactly as currently envisaged, but Lerner does not make much of a case against it. In fact, a great deal of what he discusses in his book, like cosmic plasma phenomena, is perfectly consistent with the big bang. He could have used the same material had he decided to write "The Big Bang Happened!"

(See also Martin Gardner's column in this issue—ED.*)*

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Holography, Hyperbole, and Hooey

The Holographic Universe. By Michael Talbot. HarperCollins, New York 1991. 338 pp. Cloth, $19.95; paper, $10.00.

ROBERT A. BAKER

According to the cover of Michael Talbot's latest excursion into pseudoscience, his *Holographic Universe* provides "a remarkable new theory of reality that explains: the paranormal abilities of the mind; the latest frontiers of physics, and the unsolved riddles of brain and body." Unfortunately it does none of these things, since a mere analogy is neither a sufficient nor a satisfactory explanation, particularly for matters as

complex as the mind, physics, the brain, and even the paranormal. As a whole, the book is simply incredible. If the platypus is an animal that has to be seen to be believed, then Talbot is a writer who has to be read to be disbelieved.

As one of the paranormal's brightest and most indefatigable defenders, Talbot has striven mightily over the past decade to place the supernatural on solid scientific ground. In doing so, he has created a new genre: *pseudoscientific fiction.* His first contribution to the genre was *Mysticism and the New Physics* (1980), in which he attempted to unify subjective and objective reality with Eastern mysticism. This was followed a few years later by *Beyond the Quantum* (1986) and then by *Your Past Lives: A Reincarnation Handbook* (reviewed in *SI*, Winter 1992). Undeterred by his misinterpretation and misapplication of quantum theory and hypnosis, Talbot has now tackled holography and Bohm's "implicate order" and thrown both for a substantial loss.

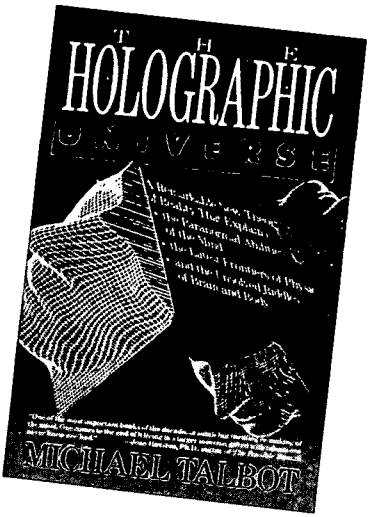
In Talbot's hands the trivial becomes titanic and the mundane miraculous. A master of hyperbole, he piles exaggeration upon exaggeration. Talbot is able to see significant and causal connections between the most random and chaotic of disparate things and events. Zeroing in on the speculations of London physicist David Bohm and Stanford neurophysiologist Karl Pribram that the universe is a hologram, Talbot outspeculates both of them by taking their surmises boldly where no man has gone before or will ever go. In the hologram Talbot sees the answer to every human mystery, problem, and puzzle our species has ever encountered.

Dennis Gabor, the Hungarian-born British physicist, invented holography in 1947 and later won a Nobel prize for his work. Simply put, a hologram is a three-dimensional photograph. Unlike conventional photography, which uses light reflected from an object and focuses it on a piece of film, holography uses a split beam of light. One part of the beam—called a reference beam—goes directly to the photographic plate, while the other part is reflected off the object being holographed. When the two beams intersect, they create an interference pattern that is recorded on holographic film as a complex pattern of stripes and whirls, much like the intersection of wave patterns created when two stones are dropped simultaneously into a still pond. Once developed, the hologram bears no visible resemblance to the subject—in fact it seems almost transparent. Yet when a reference beam is shown through the hologram, the interference pattern acts like a grating, bending the light via diffraction and re-creating an image of the original in three dimensions. Making a hologram requires coherent light, i.e., light of the same color and wavelength, like one obtained from a laser beam.

According to Talbot, "The most staggering thing about the holographic model was that it suddenly made sense of a wide range of phenomena so elusive they generally have been categorized outside the province of scientific understanding. These include telepathy, precognition, mystical feelings of oneness with the universe, and even psychokinesis, or the ability of the mind to move physical objects without anyone touching them" (p. 2). This starts Talbot's ball rolling and he barrels ahead to tell us that holography does much more. It helps explain "virtually all paranormal and mystical experiences," even the unusual near-death experiences, which are a "mere shifting of a person's consciousness from

one level of the hologram of reality to another." Archetypal experiences, encounters with the collective unconscious, and all other unusual phenomena experienced during altered states of consciousness are, similarly, understood. So even are lucid dreams, which, Talbot writes, are "actually visits to parallel realities, and the holographic model will ultimately allow us to develop a 'physics of consciousness' which will enable us to explore more fully these other dimensional levels of existence." As for Jung's synchronicities, or unusal coincidences, these are nothing more than "flaws in the fabric of reality."

Hyperburbling along, Talbot reins himself in slightly, after a time, to mention that many of his ideas—including the holographic model itself—are "highly controversial and by no means accepted by a majority of scientists." Then, in an extraordinary burst of candor, Talbot admits: "One final piece of evidence in favor of the holographic model is the paranormal itself. . . . Because paranormal events cannot be accounted for by our current scientific understandings, they cry out for a new way of looking at the universe, a new scientific paradigm. In addition to showing how the holographic model can account for the paranormal, the book will also examine how mounting evidence in favor of the paranormal in turn actually seems to necessitate the evidence of such a model." Lifting himself by his own bootstraps Talbot then tells us: "The fact that the paranormal cannot be explained by our current scientific worldview is only one of the reasons it remains so controversial. Another is that psychic functioning is often very hard to pin down in the lab, and this has caused many scientists to conclude it therefore does not exist." And Talbot astutely observes, "Science is not



prejudice-free." For this extraordinary discovery Talbot's authority is none other than the physician-cum-dimestore-philosopher Bernie Siegel, who sagely remarks that "people are addicted to their beliefs, which is why when you try to change their beliefs they act like an addict." Nothing could be truer of Talbot and his addiction to the supernatural, because he next confesses, "I grew up in a psychic family."

While heredity may well explain Talbot's addiction to all things occult, it fails to account for his extraordinary imagination and his incredible skill in explaining mystery after mystery in terms of other, even more mysterious and strange concepts. Using Pribram's idea that the brain may work like a hologram to create three-dimensional images in our heads and Bohm's idea that there is another level of reality enfolded beneath the physical reality of our everyday perceptions, Talbot unhesitatingly states that not only is the brain a hologram but that the entire cosmos is also a hologram! From

these premises stupendous corollaries ensue: "The past is a hologram and is not lost, but still exists in some form accessible to human perception . . . and the human mind and the holographic record of the past already exist in the same domain [and] are, in a manner of speaking, already neighbors. Thus, a shift in the focus of one's attention may be all that is needed to access the past." For Talbot, this explains both clairvoyance and hauntings. Since the past is holographically "recorded in the cosmic airwaves and can occasionally be plucked out by the human mind and converted into holograms," some gifted psychics learn to "tap into this dazzling and infinite treasure-trove" within the "shimmering holographic record of the past." Moreover, according to Talbot, "As disconcerting as having access to the entire past is, it pales beside the notion that the future is also accessible in the cosmic hologram" (p. 205). Talbot then adds, "Every cell in our body enfolds the entire cosmos" and "our brains even construct space and time inside our heads."

The holographic paradigm, Talbot believes, also solves all of psychology's problems because there are unexplainable linkages between the consciousnesses of two or more individuals. This explains ESP. As for psychoses, Talbot says psychotics are also able to experience certain aspects of the holographic level of reality; and occasionally, when there are losses of boundaries, they can read the thoughts of others; and sometimes they experience the implicate order—their internal reality—directly. All illogical thinking is of the implicate order. Dreams are all internal holograms, and lucid dreams (and perhaps all dreams) are actually visits to parallel universes! Multiple personalities are due to the fact that the "self is a hologram." Thus the multiple-personality disorder is nothing more than a shift from one holographic self to another! There is no difference between the mental and physical worlds, and the body is also holographic. By simply recognizing the unbroken wholeness of things, Talbot says, we can cure our illnesses and get well. For example, merely keeping a diary of one's headaches forces them to go away. Placebos work because the mind/body is unable to distinguish between an imagined reality and the real one. To cure ourselves, all we have to do is "harness the powers of the holographic brain." Since the mind/body ultimately cannot distinguish between the neural holograms the brain uses to experience reality and the ones it conjures up when it is imagining reality, we are all shamans, wonder workers, and yogin.

Toward the middle of this extravaganza, after Talbot is really warmed up, we encounter such doozies as the following: "The laws of physics are habits. Matter is a kind of habit." All miracles—e.g., the blood of Saint Januarius, stigmata, levitations, inedia, miraculous healings, and such—are due to psychokinesis (PK), and PK is due to the fact that "reality is in a very large part a construct of the imagination." Talbot then asks, "Does consciousness create subatomic particles?" He answers, "Of course." As far as things paranormal are concerned Talbot is very systematic, and no paranormal theme or event is neglected. All things are possible because there are "an infinite number of potential realities." Sai Baba, Swedenborg, bilocation, auras, Shamanism, Castenada, psychometry, psychic archaeology, reincarnation, remote viewing, out-of-body experiences, near-death experiences, anything and everything is easily explained. Even UFOs. According to Talbot, "There is evidence that some

UFOs may also be some kind of hologramlike phenomena. . . . It has become increasingly apparent they are not extraterrestrial in origin."

Talbot's ultimate objective becomes clear when we encounter in the final chapter of this tome his plea for "a basic restructuring of science." Since present-day science will not tolerate such ideas, we should reframe and restructure our science so that it can accept and incorporate them! In other words, if the shoe doesn't fit—modify the foot. In Talbot's world, fantasy is not the problem—it's reality. Science's biggest problem, according to Talbot, is its domineering attitude. The poor paranormal researchers, it seems, are so afraid of ridicule nowadays they simply refuse to come forward with their astounding discoveries. In Talbot's words, ". . . It appears that fear of ridicule may be as much if not more of a stumbling block as disbelief in getting the scientific establishment to begin to treat psychic research with the seriousness it deserves."

One cannot get too upset with these excursions into the further reaches of the human imagination because it is very, very difficult—if not impossible—to take them seriously. Talbot apparently consults psychic practitioners in caring for his health. On page 284, he confesses: ". . . In a holographic universe we can no longer view consciousness as confined solely to the brain. The fact that Carol Dryer was able to communicate with my spleen and tell me it was upset because I had yelled at it indicates that other organs in our body also possess their own unique forms of mentality."

It is clear from the outset that Talbot wishes to be taken seriously and hopes to become the premier psi-scientist of his generation, outdoing Fritjof Capra, Gary Zukav, Lyall Watson, Fred Alan Wolf, and others. In his haste to connect everything with everything else, however, Talbot fails to heed the wisdom of others who have also looked at the physics of mysticism and the holographic paradigm.

A decade ago Ken Wilber noted, "The statement that: 'the world views of physics and mysticism are similar' is a wild overgeneralization and is based, as one physicist recently put it, 'on the use of accidental similarities of language as if these were somehow evidence of deeply rooted connections. Further, physics and mysticism are not two different levels of reality" (Wilber 1982: 166). Wilber supports this by noting that many mystically or transpersonally oriented researchers have already totally rejected the holographic paradigm.

Moreover, many physicists are "furious with the 'mystical' use to which particle physics is being subjected." Characteristic is John Wheeler's branding of the recent attempts to link physics and mysticism as "moonshine," "pathological science," and "charlatanism." Wheeler also wrote: "In the quantum theory of observation, my own present field of endeavor, I find honest work almost overwhelmed by the buzz of absolutely crazy ideas being put forth with the aim of establishing a link between quantum mechanics and parapsychology" (Wheeler 1979).

But the most important message that Talbot has missed lies in Wilber's closing comments about the holographic paradigm:

> The work of these scientists—Bohm, Pribram, Wheeler and all—is too important to be weighed down with wild speculations on mysticism. And mysticism itself is too profound to be hitched to phases of scientific theorizing. Let them appreciate each other, and let their dialogue and mutual exchange of

> ideas never cease. But unwarranted and premature marriages usually end in divorce, and all too often a divorce that terribly damages both parties. (Wilber 1982: p. 185)

In keeping with Wilber's recommendations it should be clear that Talbot's attempt to play matchmaker between science and mysticism is ill-conceived, poorly executed, and ill-timed. Not only do the two parties' philosophies and living styles clash, but neither has expressed a desire to see each other socially or even in private, much less to enter into any sort of an engagement. To preserve the public tranquility and the domestic health of both families, it is strongly recommended that Talbot's talk of an impending betrothal between science and mysticism be taken for exactly what it is: idle gossip and silly prattle.

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Skeptical Briefs

CSICOP's 15th Anniversary

Contents

The CSICOP Newsletter

Skeptical Briefs is the quarterly newsletter of the Committee for the Scientific Investigation of Claims of the Paranormal, published to inform skeptics about CSICOP activities and the pursuits of independent local and national skeptics organizations.

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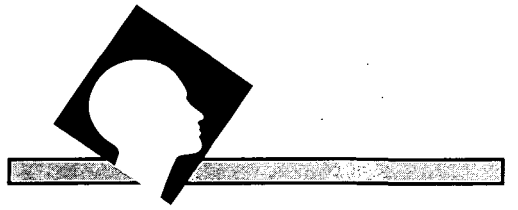

Dubious Dental Care. John E. Dodes, D.D.S. American Council on Science and Health, 1995 Broadway, New York, NY 10023, 1991. 12 pp. $3.85, paper. Booklet on dental health fraud, estimated to cost American consumers one billion dollars a year. Deals with genuine vs. dubious credentials, controversial treatment methods, and blatant quackery.

Galileo's Revenge: Junk Science in the Courtroom. Peter W. Huber. Basic Books/HarperCollins, 1991. 274 pp., $23.00, cloth. Important and timely work examines the increasing and disturbing prevalence of the courts' allowing maverick scientists, eccentric theories, and batteries of meaningless high-tech tests to determine the outcome of legal cases. "Courts resound with elaborate, systematic, jargon-filled, serious-sounding deceptions that fully deserve the contemptuous label used by trial lawyers themselves: *junk science.* Junk science is the mirror image of real science, with much the same form but none of the same substance." The rules of evidence now allow "almost any self-styled scientist, no matter how strange or iconoclastic his views" to testify in liability cases. Many highly publicized cases have been determined this way, resulting in astronomical judgments, bankrupted companies, and doctors being driven out of business. "Among all the many refractory problems of our modern liability system, junk science is the most insidious and the least noted," says Huber. "Scientific humbuggery in court has become an immensely profitable business." Includes discussions of the "science of things that aren't so," law and pseudoscience, cashing in on magical cures, "chemicals cause everything," clinical ecology, and the legal pursuit of fad terrors.

Immortality. Edited by Paul Edwards. Macmillan, New York, 1992. 337 pp., $11.00, paper. Philosophical writings from Plato to modern thinkers about immortality, the mind-body problem, and the nature of personal identity. Attempts to do justice to all viewpoints and arguments. Includes extensive coverage of reincarnation, which "has become extremely fashionable and is accepted or sympathetically considered by a great many people who are totally unaware of the case on the other side."

Logic and Contemporary Rhetoric: The Use of Reason in Everyday Life. Howard Kahane, 6th edition. Wadsworth Publishing Co., Belmont, CA 94002, 1992. 350 pp., $27.00, paper. Classic work is aimed at helping students improve their ability to reason well about everyday problems and issues—and to do so in an interesting way. This latest edition updates examples, exercises, illustrations, and information sources, adds a section on the pull of pseudoscience, and revises discussion of doublespeak and sexism in language.

The Science Gap: Dispelling Myths and Understanding the Reality of Science. Milton Rothman. Prometheus Books, Buffalo, N.Y., 1992. 254

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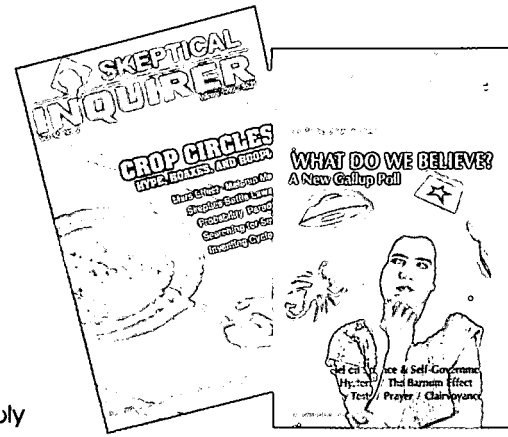

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FALL 1978 (vol. 3, no. 1): An empirical test of astrology, *Bastedo*. Astronauts and UFOs, *Oberg*. Sleight of tongue, *Schwartz*. The Sirius "mystery," *Ridpath*.

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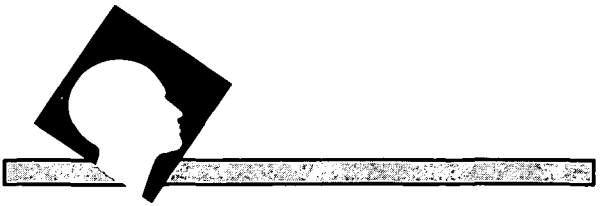
FALL/WINTER 1976 (vol. 1, no. 1): Dianetics, *Wallis*. Psychics and clairvoyance, *Fine*. "Objections to Astrology," *Westrum*. Astronomers and astrophysicists as astrology critics, *Kurtz and Nisbet*. Biorhythms and sports, *Fix*. Von Däniken's chariots, *Omohundro*.

pp., $24.95, cloth. While scientific knowledge is ever-expanding, misconceptions about the natural world and the nature of science itself abound. Physicist Rothman examines 16 frequently encountered myths about the nature of science ("Nothing is known for sure," "Nothing is impossible," "All theories are equal," "Nothing exists until it is observed," "Scientists don't have any imagination," etc.) and exposes the misconceptions and false assumptions behind each. This is an expansion of his article "Myths About Science . . . and Belief in the Paranormal" in the Fall 1989 SKEPTICAL INQUIRER.

—*Kendrick Frazier*

Articles Of Note



Dvorak, John C. "How Lazy New Agers Brought Back That Dreaded Term 'Paradigm Shift.'" *PC Computing*, March 1992, p. 44. Column skewers management gurus and industry magazines for adopting buzzwords used by the New Age movement: "You know, the people who have lost faith in scientific method and who eschew research in favor of the advice of a bald-headed shaman named Ekododo. . . ."

Goetzmann, William H. "The Rage for Antiquity." *Science*, December 6, 1991, pp. 1528-1529. Book review of Stephen Williams's *Fantastic Archaeology*, "a wonderful ride through Never-Never Land where Vikings land in western Oklahoma and sail away into the sunsets of the California deserts; where all over the continent are clues by way of ancient Hebrew inscriptions, Egyptian hieroglyphics, . . . Norse rune stones and rusted swords, and Barry Fell's sacrificial altars. . . ."

Goodstein, David. "Scientific Fraud." *American Scholar*, Autumn 1991, pp. 505-515. Goodstein argues that the line between scientific judgment and fraud is not as rigorous as the federal government's new Office of Scientific Integrity would have us believe. He gives examples of standard procedures that could be considered fraudulent.

Hansson, Sven Ove. "Is Anthroposophy Science?" *Conceptus*, vol. 25(64): 37-49, 1991. Examination of the claims of anthroposophy, one of the most successful occult movements in Europe, to be a science. Uses two criteria, intersubjectivity and confirmation by empirical science, both of which have been accepted by the movement's founder, Rudolf Steiner. On this basis concludes, "The claims that anthroposophy is a science are not justified."

Hipschman, Ron. "So You Want to Be a Psychic?" *Exploratorium Quarterly*, Winter 1991, pp. 8-11. Explains how believers in astrology and other "unconventional" sciences are led astray by some basic human tendencies innate in all of us: "We tend to personalize unrelated facts; we tend to believe positive things about ourselves; and we tend to remember events selectively."

Holton, Gerald. "How to Think About the 'Anti-science' Phenomenon." *Public Understanding of Science* (Institute of Physics, U.K.), 1(1): 103-128, 1992. Important essay by Harvard physicist and historian of science. Presents a framework for deciding which forms of opposition to science are relatively negligible and which are potentially dangerous, and what they portend for science and culture. Belief in anti-science (or "alternative science" or "parascience") is grounded in a person's functional worldview, says Holton. It is one symptom of a long-standing struggle over the legitimacy of the authority of conventional science, as well as the concept of modernity in which science is embedded. He proposes strategies for dealing with "the set of countervisons which periodically attempt to raise themselves from the level of apparent harmlessness to that of politically ambitious success."

Hoyt, Erich. "Into the Mystic." *Books in Canada*, November 1991, pp. 11-13. A lengthy review essay about John Oliphant's *Brother Twelve*, a biography of the mystic/charlatan Edward Arthur Wilson, who in 1927 founded the Aquarian Foundation, a utopian colony in Canada that promised to lay the foundations of "the new age."

Kanitscheider, Bernulf. "A Philosopher Looks At Astrology." *Interdisciplinary Science Reviews*, September 1991, pp. 258-266. The author feels scientific arguments against astrology have been contradictory and unsystematic. He attempts an organized ontological review of the flaws in astrology.

Lett, James. "Interpretive Anthropology, Metaphysics, and the Paranormal." *Journal of Anthropological Research*, Fall 1991, pp. 305-325. Examines the epistemology of interpretive anthropology, which is founded on two premises: that evocation and interpretation, rather than description and explanation, are sufficient and appropriate goals for anthropology, and that objective scientific descriptions and explanations of human affairs are unattainable. Finds both premises insupportable, "as can be demonstrated from the absurd conclusions that inevitably result when those premises are applied to claims of paranormal phenomena." Paper identifies the logical errors of "postmodernism" and suggests a reconciliation between scientific and interpretive approaches in anthropology.

Levy, Steven. "Sensitive New Age Software." *MacWorld*, April 1992, pp. 63-65. Tongue-in-cheek review of software representing a budding genre, Sensitive New Age Software (e.g., Mac-Horoscope, Psychic Reward, Synchronicity). "It would have you believe that alchemists, magic, and sorcerers in those creaky days of yesteryear would have performed even more powerful magic if they'd had Classics, IIci's, and Quadras at their disposal."

McCarthy, Kathleen. "Belief in Paranormal Isn't OK, It's Harmful." *APA Monitor* (American Psychological Association), November 1991. News article summarizes paper by Terence Sandbeck given at APA meeting in August 1991.

Oldenburg, Don. "The Plots Thicken: Conspiracy Theorists Are Everywhere." *Washington Post*, January 28, 1991, p. E5. Inquiry into conspiracy theories and the psychological and sociological explanations for their appeal.

Reibstein, Larry, and Karen Springen. "Spotting the Write Stuff: Is Graphology Emerging from the Kooky Closet?" *Newsweek*, February 17, 1992, p. 44. Brief feature alleges that graphology "may be moving out of the kooky closet" despite critics' denouncements that it has "about as much scientific validity as tea leaves." Companies are using graphology more in hiring decisions "because, well, not much else is available."

Rousseau, Denis L. "Case Studies in Pathological Science." *American Scientist*, January-February 1992, pp. 54-63. Excellent inquiry by a Distinguished Member of Technical Staff at AT&T Bell Laboratories into how the experimenters' loss of objectivity led to false conclusions in the studies of polywater, infinite dilution, and cold fusion.

Rout, Lawrence. "Fables of Fright." *American Way*, January 15, 1992, pp. 38-41. Feature about research into contemporary legends—myths of killer clowns, poisoned candy, and such—focusing on the work of English professor Bill Ellis and the International Society for Contemporary Legend Research.

Utts, Jessica. "Replication and Meta-Analysis in Parapsychology." *Statistical Science*, 6(4): 363-378, 1991. Overview of the use of statistics in parapsychology and a summary of the meta-analyses that have been presented. This paper, by a statistician sympathetic to parapsychology, is followed (pp. 379-395) by a series of comments by other scholars on both sides of the issue, including Ray Hyman, Persi Diaconis, Joel B. Greenhouse, Frederick Mosteller, and Robert L. Morris, and a rejoinder (pp. 396-403) by Utts.

Wood, Daniel. "The Psychic Search for Selma Sung." *Vancouver*, February 1992, pp. 24-27. Feature on use of psychics in a police case differs from the usual in that a prominent skeptic, psychologist Barry Beyerstein, is actually quoted; adds that "the Victoria police, it turns out, share Beyerstein's doubts."

—Kendrick Frazier and Robert Lopresti

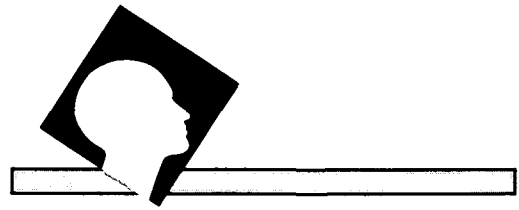
Watch for a CSICOP Seminar/Workshop Near You

CSICOP has scheduled several seminars and workshops, under the auspices of the Institute for Inquiry, in the coming months:

Chicago, Illinois—Saturday, September 19
Boston Massachusetts—Saturday, November 15
Miami, Florida—Saturday, December 13
Los Angeles, California—Thurs.-Sun., Jan. 14-17, 1993

Further details will appear in future issues, or write to Barry Karr, CSICOP, P.O Box 703, Buffalo, NY 14226-0703, or call him at 716-636-1425.

Follow-Up



UFO Crash At Roswell?

DONALD R. SCHMITT
AND KEVIN D. RANDLE

In his review of our *UFO Crash at Roswell* (*SI*, Fall 1991), Philip J. Klass makes blanket claims and statements that seriously distort our argument and the evidence we gathered. Given space limitations, we can only detail a few of his errors and omissions in this reply.

Klass attempts to show that the debris recovered at Roswell was nothing but a weather balloon with a radar-tracking device by explaining away the testimony of key witnesses and by downgrading their status to "low-level military personnel." Klass is able to do so only because he engages in the same type of coverup of which he accuses us: omitting evidence that would disprove his claims.

A most egregious example of this is the statement that "three persons were firsthand witnesses to the original debris." This is nonsense, as Klass must know. A fourth living witness studiously avoided by Klass is M/Sgt. Lewis (Bill) Rickett, who worked directly under Captain Sheridan Cavitt in counterintelligence. We report (pp. 159-160, 162-163) on two interviews with Rickett in which he describes his *visit to the original debris field* and the bizarre nature of the debris. Rickett also confirmed the extraordinary secrecy surrounding the debris recovery efforts.

Klass completely ignores this crucial aspect of secrecy. With one exception, *all* the firsthand military witnesses who were on the debris field have said they were sworn to secrecy in July of 1947. This information is in our book, but Klass chooses not to mention it. One such person is Major Edwin D. Easley, who was Provost Marshall (chief of the MPs) at the base. Easley (p. 270) claims that he was sworn to secrecy and and can't talk with us about his role or what he knows of the recovery. Klass, while never mentioning such military witnesses directly, must conclude they were either lying or were misled by our questioning. But given that these men were members of an elite military group, these are both rather ludicrous "explanations" for their testimony.

Klass makes much of the fact that Cavitt, whom he goes on about, contradicts our version of events and that we don't mention him until late in the book. However, Cavitt asked us to mention him in the book as little as possible. We honored his request, even though we knew critics would use this as a red herring.

In any case, Cavitt's testimony is suspect, not only because his fellow counterintelligence agent, Rickett, contradicts it, but because Cavitt

misled us about other, documented facts. For example, when we originally contacted him, he denied he was ever *stationed at Roswell in 1947!* At this point, there is no reason to use his testimony to verify anything.

Klass refers to two military documents as proof there is no coverup, but he fails to mention Brigadier General Arthur Exon's testimony (pp. 108-112, 231-234). Exon was base commander at Wright-Patterson Air Force Base in 1964. As such he was aware of a "top secret committee" that had been formed to study the Roswell debris. He also had direct knowledge of a secret UFO-investigation team that periodically staged at Wright-Patterson before leaving on a mission. Does Klass wish to claim that General Exon is lying or confused?

We have demonstrated that Klass's review seriously misrepresents the nature of evidence in our book by leaving out critical information that supports the coverup scenario. We certainly don't mind a fair debate on the Roswell event, but we are disheartened when our work is unfairly attacked.

Response to Schmitt and Randle

PHILIP J. KLASS

If the tales told by what Randle and Schmitt call "firsthand military witnesses" who claim "they were sworn to secrecy" are true, these sources obviously are persons who readily violate their oaths. This by itself should make their tales suspect. Curiously, none of them—including Exon—has been admonished, let alone punished by loss of military service/retirement benefits, so far as is known.

Randle/Schmitt ignore numerous contradictions between the tales they have been told by different "witnesses." And two of their key "firsthand witnesses" have subsequently recanted and significantly changed their stories. They opt to rely on flawed 40-year-old recollections and to ignore hard evidence in the form of once "Secret" and "Top Secret" CIA and Defense Department documents that deny their crashed-saucer fantasies.

Philip J. Klass, chairman of CSICOP's UFO Subcommittee, is writing a book on "crashed saucer" claims that is expected to be published late this year by Prometheus Books.

Forum

A Tabloid Encyclopedia? The Americana *Disappoints*

LEWIS JONES

Imagine, if you will, that I am a believer who has seen the light. I have discovered the SKEPTICAL INQUIRER of course, but copies are few and far between—once every three months is not exactly a filling diet. What I need is a good solid source of information. Something I can turn to whenever I need to check the facts.

An encyclopedia? Why not? It's not confined to any one subject, and it covers just about everything you could want to know. I ask around: Which is the most prestigious? In the United States, how about the *Encyclopedia Americana*? Last-minute source of doubt—it costs hundreds of dollars. I check it out. Is it constantly updated? They say yes. Are the articles written by acknowledged experts? They say yes. Hang the expense. I'll have it. It's a lifetime investment.

Got it. All 30 volumes. Check the publication date—this year. And now, feet up. Stand by for an education in my own living room. Eeny-meeny-miny-mo: PARAPSYCHOLOGY.

> While in a trance or through automatic writing, these mediums gave accurate descriptions of people or events they could not normally have known.
>
> So many laboratories using ultracareful methods have demonstrated ESP and PK that both seem well established, but some scientists remain skeptical.
>
> Some gifted subjects are quite consistent, and some relaxation procedures give fairly consistent results even with unselected subjects. This last implies that ESP and PK abilities are common but ordinarily weak and erratic.

I put opinion on hold and try TELEPATHY.

> Laboratory investigators seem to confirm that telepathy can occur.
>
> The sender translated the digits of a random number table into a private code, never written or spoken, then "sent" the message in code. These examples have given results that cannot be explained by chance, thus indicating the existence of "pure telepathy."

Sigh.

CLAIRVOYANCE?

> Although it was formerly believed that few persons were clairvoyant, modern research indicates that clairvoyant ability of a very faint, intermittent sort is widespread.

How about people rather than subjects? You might expect that historical and biographical detail would perhaps be less amenable to distortion. But the article on JOSEPH BANKS RHINE informs us that "PK is a direct mental influence on outside events such as dice throws."

And so to DANIEL HOME.

> Hundreds of reputable witnesses reported that they saw him levitate, sometimes remaining about a foot in the air for several seconds. Three witnesses said that while they were in semi-darkness they saw him levitate horizontally through a window open only about a foot and return through an open window in the next room.

This wildly inaccurate account of the happening at Ashley House would be considered lamentable in a tabloid newspaper. What is it doing in America's encyclopedic high-flyer, rubbing shoulders with properly researched accounts of plasma physics and the cardiovascular system?

All the examples so far are from the pen of one contributor—Gertrude Schmeidler. But others have made their offerings.

Rhine himself was assigned the article on SPIRITUALISM:

> Experimental studies in extrasensory perception . . . have shown that the mind can, in certain instances, reach out across space and time and physical barriers to acquire information that the senses and the reason could not obtain.

Our source of information on the SHROUD OF TURIN is Robert Drews, author of the pro-authenticity *In Search of the Shroud of Turin:*

> . . . Tests carried out in the 1970s proved that the image was not painted and that the bloodstains on it were real.

There is no way of avoiding the radiocarbon tests that dated the Shroud to the thirteenth or fourteenth century of course. But in these murky areas, science is easily dismissed:

> Nevertheless, no tests were conducted on portions of the cloth bearing the image, and the question of the image's origin remains unresolved. . . . Many continue to believe that the image was produced miraculously at Jesus's resurrection from the dead. On announcing the results of the test, the Roman Catholic Church, which had never formally declared the Shroud to be Jesus's burial cloth, made it clear that it continued to regard the Shroud as a proper object of veneration.

Some contributors prefer the cloak of anonymity. From one of these, we learn that though the Italian medium EUSAPIA PALLADINO was sometimes caught in trickery, she was "noted for her powers of telekinesis or psychokinesis."

She was investigated by scientists, and "in their presence, she apparently discharged an electroscope and made a lever balance register a weight of 7 kg (15.4 pounds), again without touching them. In 1908, while she was being investigated by the Italian criminologist Cesare Lombroso, she apparently made a table rise into the air, where it was photographed."

In the BERMUDA TRIANGLE (you will not now be surprised to learn) "more than 100 planes, ships, and boats with more than 1,000 seamen and airmen are believed to have disappeared, . . . leaving no trace. In some cases no distress message was received, heightening the mystery."

At least Larry Kusche's two books are among those suggested for further reading, but then so is *Without a Trace: New Information from the Triangle,* by C. F. Berlitz and J. M. Valentine.

As an antidote to this depressing catalogue, I can offer only a few whiffs of the breeze of cool reason.

DOWSING has been mercifully alloted to E. Z. Vogt and L. K. Barrett:

> Controlled field and laboratory tests have failed to establish the validity of dowsing, and judged by scientific standards the practice has little basis in fact.

ASTROLOGY, "in spite of attempts to establish itself as a science, must be considered a pseudoscience and a divinatory art." (Grateful thanks to Erika Bourguignon, professor of anthropology at Ohio State University.)

A few welcome words on GRAPHOLOGY from Michael Rothenberg, of the Department of School Services, City College, New York:

> Much handwriting analysis is pseudoscience, closer to fortune-telling than serious research.

And finally, two contributions from Miriam G. Hill, associate professor of journalism at the University of Alabama.

First, HOMEOPATHY:

> The critics of homeopathy have claimed that homeopaths are concerned only with the symptoms of diseases and do not try to recognize or treat the underlying cause of diseases. Hahnemann's minute dosage has also been scorned, as well as his erroneous belief that all chronic illnesses develop from three sources: syphillis, venereal warts, or psor (itch). The view of the American Medical Association is that homeopathy is only of historical interest as a progressive departure from the primitive forms of therapy it surpassed.

And this on CHIROPRACTIC:

> The American Medical Association has charged that CHIROPRACTIC constitutes a hazard to rational health care in the United States because of the substandard and unscientific education of its practitioners and their rigid adherence to an irrational, unscientific approach to disease causation.

What is one to make of all this? What is the point of singling out the tabloid press for sloppy research, when a student seeking factual help has to turn to an encyclopedia that can't even get Houdini's birth date right, 20 years after the Society of American Magicians established it with a copy of his birth certificate?

There is a lesson to be drawn, and a trap to be avoided.

For information on calculus you would turn to a mathematician, and an article on isomerism would be farmed out to a chemist. The principle seems obvious: "Get your information from a practitioner who specializes in the subject."

The trap lies in not completing the principle: "Get your information from a practitioner who specializes in the subject, *provided the subject has a scientific basis.*"

So-called researchers for television programs notoriously fall head first into this trap. When they need a comment about an unidentified flying object, they normally reach for a list of UFO enthusiasts and pick up the phone. (At least the *Americana* got this one right—they allotted their article on UFOs to Carl Sagan.)

And the lesson is for readers: In a standard definition of the word *encyclopedia* (a work that contains information on all branches of knowledge), be particularly wary of the term *information.* The expression "tabloid encyclopedia" may not be quite the contradiction you thought it was.

Lewis Jones is a writer in London.

A CSICOP SEMINAR

The Skeptic's Toolbox

University of Oregon at Eugene
Thursday-Monday, August 20-24

The workshop will begin with dinner and an introduction on Thursday night, August 20, and will adjourn at noon on Monday. Our goal is to sharpen the ability of skeptics to deal with various situations. Some of the topics to be covered by the five lecturers are:

The Brain and Psychic Experience
How Our Minds Can Deceive Us
How Children Succeed in Fooling Adults
The Statistics of Coincidences
The Dowsing Rod and the Ouija Board
How to Avoid Legal Pitfalls
Pitfalls in Psychical Research
How to Deal with the Media and Confrontational Challenges
How to Convince Strangers You Are Psychic
How to Distinguish Good from Corrupt Information

Ray Hyman, the workshop coordinator, is a professor of psychology at the University of Oregon and a member of the CSICOP Executive Council. He has written extensively on the critical evaluation of paranormal claims. With a background in professional magic, he specializes in the psychology of human error and deception.

Barry Beyerstein, professor of psychology at Simon Fraser University, Vancouver, B.C., and a member of the CSICOP Executive Council, specializes in how the brain determines behavior. He has researched how apparently psychic experiences can be due to malfunctions in the brain.

Loren Pankratz, a clinical psychologist with the Veterans Administration in Portland, Oregon, is the world's foremost authority on the Munchausen Syndrome, which refers to patients who repeatedly and successfully fake serious illnesses. He has studied quackery in all its guises, and is a magician who writes on the psychology of conjuring.

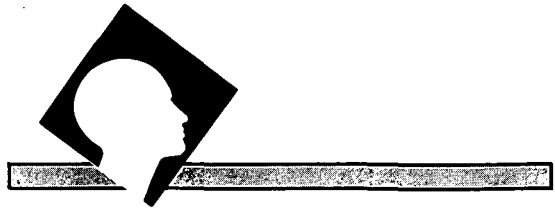
Jeff Mayhew, whose degree is in physics, has pioneered in applying computer graphics and the latest audiovisual tools to foster skepticism. He will demonstrate how to target audiences and how to deliver your message most effectively.

Jerry Andrus, magician, inventor, and iconoclast, has lectured at Harvard, MIT, the University of Oregon, and elsewhere on how people reach the wrong conclusions for the "right" reasons. He has created many optical illusions and is a consultant to major science museums.

Take advantage of this exciting opportunity to sharpen your skeptical skills, and join us on the Sunday fieldtrip to the "Oregon Vortex," one of Oregon's major "paranormal" geographical sites.

For registration information, contact Barry Karr, CSICOP, P.O Box 703, Buffalo, NY 14226-0703, or call him at 716-636-1425.

Letters to the Editor



Crop circles

I enjoyed Joe Nickell and John F. Fischer's article on crop circles in your Winter 1992 issue. I think that one of the overriding motives of the hoaxers is to put one over on the pretentious self-styled experts who see UFOs and mysterious phenomena behind every bush.

The British journal *New Scientist* reported that hoaxers with a mathematical bent struck in the cornfields of Cambridge producing a corn Mandelbrot set! Suspicion fell on the University of Cambridge mathematics department. The *Cambridge Weekly News* printed a picture of the circle, not realizing what it represented until a number of readers identified the shape and pointed out that it was probably done by Unemployed Fractal Observers.

Frank Sonleitner
Norman, Okla.

The investigative report on the crop-circle phenomenon reminded me of an amusing newspaper clipping I was sent from Germany. A synopsis is roughly as follows:

Strange Crop-Circle of the Chaotic Kind

> A crop-circle near Cambridge is currently causing some confusion—it is not a simple circle, but the most complicated object in mathematics: a Mandelbrot set. The mathematics department of the university, being under suspicion, denies being involved in any hoax. Also, Benoit Mandelbrot, the mathematical discoverer of the chaotic structure, denied, in *New Scientist*, any connection with the crop pattern. He was in North America when the pattern appeared. After a photograph of the phenomenon appeared in the *Cambridge Weekly News*, mathematicians pointed to a fact that makes a forgery rather unlikely: Unlike regular geometric patterns, fractals like the Mandelbrot set cannot just be drawn, they have to be built up point by point. And mathematicians have shown that even then it is impossible to put the pattern on paper accurately with a pen

(By the way, the probably garbled mathematicians' comments on drawing the Mandelbrot set are irrelevant: Mathematicians draw it quite often on blackboards, and the photograph looks exactly like a very good drawing of the Mandelbrot set.)

I greatly enjoy the prospect of seeing elaborate theories developed on why plasma storms should come in Mandelbrot's gingerbread-man patterns. Or why extraterrestrials are begging for gingerbread.

Boris Hasselblatt
Somerville, Mass.

Nickell and Fischer fail to take the best tack in dealing with "anecdotal" crop-circle reports.

We are confronted with a diplomatic problem any time sane-seeming individuals recount, in apparent good faith, implausible things that have "happened" to them or to those they respect. It is difficult at best to deal with this without seeming to call them crazy or liars. Although either of these may be correct, it is not efficacious to say so; so we skirt the matter and unavoidably grant our interlocutors more room than they should have. But sometimes we can do

better, and crop circles is such a case.

Delgado/Andrews write on page 21 of *Circular Evidence* that the photograph adjoining the text is notable for being free of tractor tram marks; this is important since tram marks remove any serious objection to hoaxing as an explanation for a particular incident. However, the photograph in fact shows tram marks quite clearly, including one set going through the crop circles. This kind of thing plopped on the table in the middle of a discussion is dynamite in impeaching "firsthand" accounts.

David P. Babcock
Minneapolis, Minn.

As a person long craving for a scientific explanation of the crop-circle phenomena, I could not help being disappointed by your article on the subject. The authors conclude that the circles must be hoaxes and shun the phenomena by resorting to the same circumstantial evidence they criticize so much, and by repeatedly quoting the discredited Delgado and Andrews "investigators." And to place Meaden in the same vein as that duo is a disservice to someone who has at least attempted to apply objective reasoning to the problem.

As someone who lived in the Wessex area for a few years, I can vouch for the farmers' irritation at the loss of thousands of dollars in spoiled crops. In addition to laying on such complex formations at night, any hoaxer exposes himself to the farmers' shotguns. The authors should ponder why not a single hoaxer has been caught on the spot during the many years the phenomena have existed. While there is no doubt that many of those circles are indeed the result of hoaxes, and that the phenomena have been cheapened by unscrupulous charlatans, the fact remains that they still present a valid mystery crying for rational, proved explanations. I'm for healthy skepticism on the matter; not for skepticism at all costs.

Israel del Rio
Highlands Ranch, Colo.

I read with interest the article on crop circles. I was intrigued by the idea of a "bandwagon" effect. Although the authors mentioned that the incidents increased faster than exponentially over time, I thought it would be interesting to plot the data given on page 140.

If there really is a bandwagon effect, then more publicity should yield more incidents and we would actually expect an exponential increase because dn/dt would be proportional to n. I plotted $ln(n)$, where n is the number of crop circles in a year, versus the year. The correlation between the data and the best straight line is better than 98 percent! So, we may conclude, the data we have are better than a 98-percent fit to what would be expected if the only mechanism were hoaxers jumping on the bandwagon.

Ronald Stearns
Newport Corporation
Fountain Valley, Calif.

Joe Nickell replies:

I am grateful for the input of Frank Sonleitner, Boris Hasselblatt, and Ronald Stearns.

I also appreciate the point David P. Babcock is trying to make; however, his discrediting of Delgado and Andrews's claim about the absence of tram lines, while correct, does not provide a model for dealing with—for example—the claims of three alleged eyewitnesses to the vortex creation of a circle. We do not feel that there was any impropriety in observing that "unfortunately, all waited several years before making their claims, and none described the respective events in quite the same way."

As to Israel del Rio's criticisms, first of all it was anecdotal, *not circumstantial, evidence that we disparaged, the latter often being very powerful indeed—as any textbook or law will attest. Second, his defense of Meaden over Delgado and Andrews seems predicated on the notion that pseudoscience is better than no science at all—an assumption of dubious merit. Finally, need one point out that del Rio contradicts himself? He argues against the hoax hypothesis on*

the grounds that hoaxers have not been apprehended (a weak argument, given the expanse of the crop fields), then blithely concedes "there is no doubt that many of the circles are indeed the result of hoaxes." Given such thinking on his part, one can only fear that del Rio will remain forever mystified.

Cyclosophy and pyramidology

In his "Adventures in Science and Cyclosophy," *SI*, Winter 1992, Cornelis de Jager correctly states that the ratios of height (481) to base (755) of Khufu's (Cheops's) pyramid is 1 to $\pi/2$. In fact ratios relating to π are found throughout that pyramid to great accuracy, and there is an obvious explanation. First let me state that Egyptian mathematics during the pyramid age (2800–2300 B.C.) was far from being advanced. In fact the Rhind papyrus (1700 B.C.) shows fractions were most difficult and while the concept (not the value) of π was known it was approximate by the fraction 22/7. Pi was not "sealed" within the Great Pyramid.

The reason for its occurrence is simple and known to any wheelwright. In a monograph dealing with weights and measurements of the ancient Egyptians, Sir Flinders Petrie noted that when the Khufu pyramid was built the "cubit" was preserved carefully. Until then and during the construction of earlier pyramids the cubit differed from structure to structure and often varied on a single job! By the time these geometers had reached Khufu the cubit was a standard of measurement. To lay out long linear measurements they used a wheel one cubit in diameter and rolled out an integer number of revolutions. This, naturally, inserted the value of π in the metrology of the building and throughout the structure by an analog manner.

Second point: Ancient engineers were not fools. Kurt Mendelssohn showed (*American Scientist*, 59:2, 1971) the pyramids were built on a trial-and-error basis until study culminated with the proportions of Khufu's. This was important because they needed to conserve material and labor, while achieving a stable structure.

Lastly and of most concern to me is de Jager's comment, "It has indeed some astronomical characteristics." It does not. The north-south orientation, often quoted, had religious significance and can be achieved by a method given in my 40-year-old *Boy Scout Handbook*. Further, I have shown (*Bulletin of the American Astronomy Society*, 16 [4]:887, 1984) the descending passageway sloped at 23.5651° in accordance with the fact that a stone 1 cubit square laid on top of a third in a row created an angle where: Tan $\theta \times 1/2$. This was how the builders constructed the passageway. They did not "aim" the pyramid at α Draconis. In fact α Draconis could not have been seen by an observer at the bottom of that passageway. With similar examples one can show the air vents did not slope toward celestial objects.

To sum up, the builders of Khufu's pyramid had no mathematical museum in mind when they built it, nor did they aim the pyramid at the stars. In fact many of the laborers may have wished to just dig a 6-foot hole (3.5 cubits) and plant the old tyrant! Thank you for permitting me to air my viewpoint. I hope these remarks have not distracted from the important point of de Jager's article.

R. L. Walker
Flagstaff, Ariz.

Cornelis de Jager ascribes the coincidence between π and the dimensions of the Great Pyramid to an accident. The relationship is not an accident but an artifact of the construction process.

As a physicist, engineer, and occasional lecturer on pyramid myths, I knew there was no historical evidence that the pyramid builders had known the value of π; the earliest (incorrect) value dates from a thousand years later. However, twice the base of the Great Pyramid divided by its height does approximate π.

The slope of the Great pyramid,

which determines its base-to-height ratio, is about 52°. Why was this particular value chosen from the practical range of slopes? Obviously the slope was measured during construction to ensure that it remained constant. If the measurement was done in royal cubits, which were divided into 28 fingers, then the slope of the Great Pyramid conforms to, "Measure up 1 cubit and inward 22 fingers." This makes the ratio of twice the base to the height exactly three and a seventh, which is not too bad an approximation to π.

That the slope can be represented by an integer ratio proves nothing; it might be as much a coincidence as the appearance of π. However, on examining the slopes of other pyramids built over a 300-year period I found that the majority of them could be ascribed to the same method. The vertical measurement was one cubit and the horizontal measurement was an integer number of fingers.

. . .

I don't know whether to be happy or sad that the Egyptians never built a pyramid with a setback of 19 fingers. Twice the base of such a pyramid, divided by its height, would be within 0.15 percent of the value of e, the base of natural logarithms. Claims that the Egyptians anticipated Archimedes are bad enough, at least we have been spared their having anticipated Euler and Napier.

Tom Napier
North Wales, Pa.

The amusing and insightful article by Cornelius de Jager suggests another point not specifically brought out, perhaps because not relevant to his point. Still, it can be a helpful factor in evaluating the competence of claims for the wonders of the pyramids or Stonehenge or whatever.

De Jager mentions that the ratio of the height of the Great Pyramid to its base is reported to be 1 to $\pi/2$, ostensibly proving the builders had evaluated pi. Further, the base length in "pyramid yards" is exactly 365.25, showing that they had accurately measured the length of the year. Actually, I don't see anything particularly implausible in either of these claims, but then the mystifiers shoot themselves in the foot by pointing out that "twice the diagonal contains 25,826 pyramid inches (one p.i. being 1/25 p.y.), which is the precession period in years of the earth's axis." Aren't three coincidences more convincing than two? Well, no: once the base length is set to correspond to the days in the year and the height to express pi, the diagonal is a done deal; the designer has no freedom to make it match some arbitrary third constant. In fact anyone who wants to tell me these dimensions are significant had better be prepared to start by explaining why the number of solar days in a year is related through pi to the precessional rate of the earth's axis.

Mark Drake
Leggett, Calif.

I found Cornelis de Jager's article on cyclosophy most significant and portentous.

One quibble I have is that, to the best of my recollection, the fine structure constant is not 137.0 but the *reciprocal* of that number.

I therefore can't help but wonder if, while developing cyclosophy, de Jager might not have spent some time riding his Holy Bicycle upside down?

Karl Lembke
Los Angeles, Calif.

By the Great Ogdoad, I believe Cornelis de Jager has made a major discovery! Reprints of his insightful article on the Pyramid Religion and Cyclosophy should be made available to the general public. I suggest a per copy price of $10 and a small advertisement in *Fate*. CSICOP's new headquarters building could be paid for in six months!

Kidding aside, keep up the good work. CSICOP has never been needed so badly.

John Morris
Carol Stream, Ill.

Searching for security

As Martin Grimmer suggests ("Searching for Security in the Mystical," *SI*, Winter 1992), belief in the paranormal meets some basic human need. Most people of all cultures hold some such beliefs. Although part of this need for some people is "to seek control and stability," it is ironic that for others the need is to be free of the responsibility for control and stability. In other words, let somebody else make the decisions, such as a cult leader, or assume some other force has already made the decisions, as in predestination.

Actions arising from belief in the paranormal may be from the relatively harmless, such as knocking on wood, to the grossly antihumanitarian, such as willfully allowing children to die without medical attention and human sacrifice.

In the great social morass of paranormal beliefs, the role of the skeptic needs to be concentrated on the refutation of those beliefs most damaging to personality and community.

Lyle Tatum
Riverton, N.J.

I enjoyed Martin Grimmer's article, but disagree with it. A lot that's nonmystical is a search for security, and a lot of mundane ideas have been conceived to make sense of the world. Science certainly has been. In fact, an argument can be made that science gives us greater security than all the Blavatskys and von Dänikens combined. It gives us real security. When we use Newton's Laws of Motion and Einstein's Relativity, we know they work. With German sex magic or General Semantics, or Kundalini Yoga, we are not so certain; they don't totally live up to their billing.

No, the mystical's attraction is just the opposite: it appears bold and brave. Similarly, the mystical and occult are romantic ways of thinking. They harken back to our past, they harken forward to the future, they take things one or two steps further than we more mundane mortals do. Occultists, saucer enthusiasts, etc., are always accusing scientists of being killjoys, rigid and dogmatic types, and stick-in-the-muds. Their advantage is that they seem exhilarating. Their disadvantage is that they seem crazy. It's true these occultists et al. may not actually be bold and brave: aliens creating the pyramids, a somehow living and breathing earth, reincarnation, psi powers are old hat. But they perennially seem like new hats. And that is what is important.

Richard A. Dengrove
Alexandria, Va.

Multicultural pseudoscience

While I share Bernard Ortiz de Montellano's concerns in his two articles on "Spreading Scientific Illiteracy Among Minorities" (*SI*, Fall 1991 and Winter 1992), I fear he underestimates the problem. Decrying the harm done to African-Americans by racist pseudoscience, he then suggests that, aside from the Portland *African-American Baseline Essays*, it is "spread primarily by broadcasts on black radio stations of lectures given at annual melanin conferences."

Would it were so. While the tastes of your readers might not include rap, a generation of youth gets an earful, daily, of the notions promoted by melanin scholars. Such popular groups as Public Enemy and NWA have for years been espousing the racial superiority of Africans, the blackness of ancient Egyptians, and the "theft" of Egyptian (hence, African) culture by degenerate Europeans. Preaching this material is "dropping knowledge" and is a staple of both lyrics and concert patter.

A disturbing aspect of this phenomenon is that the knowledge "dropped" is presented as a secret, privileged legacy hidden from students by racist schools. Formal science and history are not just ignored, they are scorned as the tools of oppression. Thus education, the best means of social advancement, is replaced by the cant of a tawdry impostor, a vain and rather sad set of lies.

The trend has moved well beyond rap. In a recent Michael Jackson video—an ancient Egyptian period piece—Cleopatra and her court are African. Must look right to MTV fans.

Michael Carmen Matti
Carrboro, N.C.

Questioning the 'Mars effect'

I was pleased to see the publication of Suitbert Ertel's article "Update on the 'Mars Effect' " (*SI*, Winter 1992). Michel Gauquelin's "Mars effect" is a fascinating anomaly that is worthy of skeptical attention. Ertel reevaluates the Kurtz, Zelen, and Abell (KZA) test of the Mars effect for American athletes (*SI*, Winter 1979-80) and a 1982 Gauquelin test of American athletes by dividing up the samples from both tests on the basis of a more objective measure of eminence—citation counts from a set of 18 reference works.

Paul Kurtz takes issue with Ertel's methodology in his brief reply, "A Dissenting Note on Ertel's 'Update on the "Mars Effect," ' " on the grounds that Ertel used European "who's who" books, which have a European bias against the eminence of American football and basketball players.

A European bias in Ertel's reference works does not entirely explain the results that appear in Table 1 of his article. Athletes cited in 2 or more of Ertel's 21 reference works are born when Mars is in one of Gauquelin's "key sectors" significantly more frequently than expected by chance, for both the KZA sample and for Gauquelin's 1982 American sample. Why should a European bias also be a bias for athletes born with Mars in a key sector?

There is, however, a feature of the results in Table 1 that might be explained by a bias against football and basketball stars in Ertel's reference works (assuming that such a bias exists). This is Ertel's finding that only 85 of the 408 athletes in the KZA sample had two or more citations, as compared with 162 of 349 athletes in Gauquelin's 1982 sample. Since the KZA sample contained many football and basketball players while Gauquelin tended to avoid these sports, an anti-football and basketball bias in Ertel's works could result in a greater proportion of Gauquelin's sample having two or more citations in these works than the KZA sample.

In summary, I don't think that Kurtz's response resolves the central problem posed by Ertel's analysis, though it may explain the differing proportions of "high eminence" athletes between the KZA and Gauquelin samples. A resolution to the "Mars effect" mystery remains to be seen—perhaps in a new study by the French Committee for the Study of Paranormal Phenomena.

Jim Lippard
Tucson, Ariz.

Suitbert Ertel's article sounds like a lot of after-the-fact hypothesizing to me. It is akin to searching the Bible for passages that are "confirmed" by the latest scientific data.

The selection of who is or is not "noted" or "eminent" is so subjective and liable to biases that it is hard to put much credence in the outcome of the calculations no matter how sophisticated they may be.

Part of science is prediction. It seems to me that if he wants to be taken seriously, Ertel needs to select at random a group of, say, 10,000 babies born during 1992. Then predict which ones will become "noted" or "eminent" according to a previously agreed upon set of criteria. The predictions would be based on the planetary situation at birth.

The predictions must be secret, written down, and sealed away so as not to bias the way the children are treated. Since much real talent shows up early, the trend should begin to show up in only ten years or so. Mozart and Yehudi Menuhin were only seven or so when their talent was clear. Most accomplished athletes are recognized as superior in kids' leagues. Great scientists usually do their supreme work early.

If there is really something there, ten years isn't too long to wait for the beginnings of an answer.

David J. Simmons
Ridgecrest, Calif.

Ertel fails to consider an additional alternative explanation for the Mars effect, assuming, of course, that there is some sort of effect to account for. If one is willing to assume that there is indeed a reliable correlation between the position of Mars relative to the horizon and the birth dates of people with eminence in certain domains, the problem arises of trying to find a causal link between the two phenomena. One possible resolution of this dilemma lies in finding something else that is correlated with the position of Mars in the sky for which a plausible causal connection with the birth of eminent people can be found.

One such potential candidate lies in the relation between handedness and date of birth. A number of studies have documented a relation between the incidence of left-handedness and season of birth, with left-handedness being associated with Fall and Winter births (e.g., Badian, 1983, *Cortex*, 19:451-463; Peterson, 1979, *Perceptual & Motor Skills*, 48:961-962). Similarly, other studies have demonstrated associations between left-handedness and various types of artistic and athletic ability (e.g., Hassler, 1990, *Brain and Cognition*, 13:1-17; McLean and Ciurczaj, 1982, *New England Journal of Medicine*, 2:1278-1279; Peterson and Lansky, 1977, *Perceptual & Motor Skills*, 45:1216-1218; Snow, 1985, *ESN*, 39:355-359). If the position of Mars in the sky bears a systematic relationship with the time of year, then perhaps the *real* relationship is between handedness (with its association with ability) and time of birth (with its association with handedness). In this case, the relationship involving the position of Mars would simply be fortuitous. Although this is only conjecture, it certainly is at least as plausible as any of the causal accounts offered in the article.

Thank you for providing a much-needed and much-appreciated forum for open-mindedness.

Stephen D. Christman
University of Toledo
Toledo, Ohio

Probability paradoxes

Martin Gardner's brainteasers ("Probability Paradoxes," *SI*, Winter 1992) are not really paradoxes, although they are certainly ingenious and amusing, as is everything Gardner writes. The air of paradox about his probability "paradoxes" evaporates upon reflecting that they arise from the subjectivist (personalist, Bayesian) interpretation of probability he adopts, which is inconsistent with the objectivist interpretation used in science. Let me explain.

In Gardner's probability problems, there is a question of ignorance or uncertainty, not of objective chance or randomness—which is when probability considerations are legitimate. Let us begin with the simplest problem, that of the woman who has two children, at least one of whom is known to be a boy. It makes no sense to ask what is the probability that the second child too is a boy, because he or she is already born with a definite sex. The question would have made sense only during the very short period of fertilization, because this is indeed a process of random gene shuffling, where each of the sexes has nearly the same chance, i.e., 1/2. Once the ovum has been fertilized, one of the probabilities has expanded to 1 and the other has contracted 0.

In the three-door problem the prisoners do not know who has been pardoned by the governor. During the random shuffling of three slips of paper with the names of the prisoners, each of these did have the same probability, namely 1/3, of being pardoned. But when the shuffling came to an end and only one of the slips was picked, the probability of this one expanded to 1 whereas the probabilities of the other two contracted

to 0. *Alea jacta est!* From here on the probability calculus has nothing to say because the random process has stopped. The circumstance that neither the prisoners nor their warden knew the outcome of the process does not authorize them to engage in probabilistic speculations. Probabilities can only be assigned to random events, and propositions are not among them. I have dealt with these problems in my paper "Four Concepts of Probability," *Applied Mathematical Modeling*, 5:306-312 (1981).

Finally, Hempel's "paradox of confirmation," about the way to go about testing the proposition that all crows are black, is actually a fallacy. A zoologist intent on putting the generalization to the test begins by noting that it is about crows, so he will observe crows, not neckties, socks, or what have you. (And he will eventually come upon albino crows. which will refute the generalization in question.) The fallacy originates in the logician's exclusive attention to form and his neglect of content, in particular reference, as I have shown in my *Treatise on Basic Philosophy*, vol. 1, pp. 79-81 (Dordrecht: Reidel, 1974).

Mario Bunge
McGill University
Montreal, Canada

Probability only applies to the future. The probability of flipping heads in the future is 1/2. The probability that an already-flipped coin is heads is 1/1, not 1/2. The result is fixed; we just don't know what the result is. In the example, once the governor decided whom to pardon, the probability of being executed for A and C is 1/1 or 0/1, not something in between. Knowing that B is to die does not change that fact. One might discuss the probability of A guessing the correct answer, but that is not the question posed.

In the example of the prisoners, A and C are said to have a large difference in probability of being executed. Why? How are these two people different? There is only one difference: A asked a question and was given an answer? What if C, not A, had asked and been given the same answer. Then C would have a probability of being executed of 1/3, and A of 2/3! Gardner's logic requires a belief that the act of asking the question and receiving the answer alters the probability of being executed. The *probability* of an outcome that has already been decided has been altered by the transfer of information. Now that's paranormal! What if C asked after A had asked? Would the probabilities now shift to 1/2 for each or would each prisoner have simultaneous probabilities of 1/3 and 2/3?

Perhaps this is the long-sought application of quantum mechanics to the macroscopic world. Let's call this paradox "Schroedinger's Prisoner." We know there will be two dead prisoners eventually, but we won't know which the second will be until we examine the corpses. . . .

Fredrick W. Gilkey
Takoma Park, Md.

Martin Gardner replies:

Bunge and Gilkey are quibbling over a choice of language that is universally used by ordinary people, gamblers, mathematicians, and scientists. If I draw a card from a deck, it is perfectly proper for me to say, "The probability that this card is the Queen of Hearts is 1/52." Everybody knows that the card either is the QH or not the QH, and that what I mean is that I calculate the probability to be 1/52 that it will be seen as the QH if I turn it over.

Consider the problem of the two children as modeled by a dime and a penny. I flip both coins and a person with his back turned to me asks, "Is at least one coin heads?" I say yes. No mathematician would hesitate to say that the man could not correctly declare, "The probability both coins are heads is 1/3." Everybody understands that the coins either are or are not both heads. If he were to ask, "Is the penny heads?" and I answer yes, the probability rises to 1/2

The three problems discussed in my

column obviously are not paradoxes in the sense of logical contradictions, but in the familiar sense of being surprising and counter-intuitive. For a good analysis of the three-door problem, and the second-ace problem, see "The Car and the Goats," by the distinguished mathematician Leonard Gillman in the American Mathematical Monthly, *January 1992. (Note that he uses the same language I used.)*

As for Bunge's quick dismissal of Hempel's notorious induction paradox, it seems to me he evades Hempel's subtle argument. To the many readers who wrote about this paradox, I urge them to look up my discussion in Hexaflexagons and Other Mathematical Diversions, *a University of Chicago Press paperback, and check some of the papers listed in my four-page bibliography.*

Lessons of the "Three Door Problem"

Editor's Note: Letters on the "Three Door Problem" keep flowing in, but we must move on to other matters. The letter below was selected from all of them. It elucidates some issues external to the problem itself that are well worth remembering.

The recent and continuing flap over Marilyn vos Savant's "Three Door Problem" (*SI*, Summer 1991; Winter 1992) should have taught all of us an object lesson or two; I certainly learned from it. At the same time, it has provided us with a powerful demonstration of some important issues.

As intriguing as the problem is in itself, all the more so are the approaches to its solution and the attitudes of the authors of the published letters of response. So far as the first point is concerned, each of us made assumptions about the nature of the problem—some of us used only those that were explicitly stated in the *Parade* excerpt, some (e.g., myself) included their recollection that Monty Hall *always* opened a "goat door" (apparently vos Savant's intended version), still others recalled the option of taking cash instead of (or in addition to) another door selection, etc. Nonetheless, each of us made some decision as to the nature of the probabilities involved and acted accordingly.

As to the second point, that of attitude, I was surprised and saddened by the presence of ad hominem (and ad feminam) responses (e.g., "should stick to medicine and leave mathematics to those trained it"; ". . . Vos Savant's mumbo-jumbo of an explanation"; "Maybe women look at math problems differently than men"). Such attacks in no way substitute for solid argument, any more than does an appeal to authority ("If all those Ph.D.s were wrong, the country would be in very serious trouble"). Nevertheless, how often *have* these methods been used to quash opposition in science or elsewhere, when there is no other rebuttal?

We should have little difficulty with the first point. If we can agree on the actual assumptions, then we must agree with the results (as did 82 percent of the respondents to *SI*). As to the second point, even (or especially) in the face of vague information, one should not resort to abandoning investigation in favor of insult. If nothing else, this is what *we* criticize in *them*.

If one considers the issues that *SI* regularly covers—the MJ-12 papers; the alleged benefits of firewalking, homeopathy, or psychoanalysis; the Shroud of Turin; whether the "face" on Mars is that of Elvis, etc.—it should be obvious that the "Three Door Problem" is somewhat more cogent to the general public ("My God, Mary! Here's how we win a car!"). In another sense of cogency, it has the advantage of being easily tested by means available to anyone who cares to do so, and thereby it provides the opportunity to preach not just to the choir but to the flock. (Martin Gardner's autohistorical piece in the Winter issue yields other versions of this same problem, as do John Allen Paulos's *Innumeracy* and Robyn Dawes's *Rational Choice in an Uncertain World.*) I can claim two new subscribers to *SI* as a result, one of whom related a similar unresolved debate in the *Mensa Journal.*

In the end, however, maybe the "flock" *is* us, since *we* are obviously

subject to the same frailties that are ordinarily and automatically attributed to *them*.

James M. Price
Dept. of Psychology
Oklahoma State Univ.
Stillwater, Okla.

Coelacanth confusion

Unfortunately, Paul T. Riddell's review, ("What About the Coelacanth?" (*SI*, Winter 1992), perpetuates and contributes to some of the confusion concerning this fish. For one thing, Riddell refers to it as "the sole known remnant of the Crossopterigii [*sic*], the family of fishes that includes the ancestors of modern tetrapods [that is, the amphibians, reptiles, birds, and mammals]." Actually, the family of fishes that the living coelacanth belongs to is the Latimeriidae, a family, by the way, totally unknown in the fossil record, contrary to what one usually hears about this creature. Its closest known fossil relatives from the age of dinosaurs are actually no more nearly related to it than a beagle is to a polar bear. Furthermore, although the *order* (not *family*) Crossopterygii does include the fossil and present-day coelacanths in one conservative scheme of classification, it was another group of fishes sometimes placed in this order, namely, the Rhipidistia, that scientists usually credit with providing the ancestral stock for the land vertebrates. A coelacanth is not more closely related to one of these Rhipidistia than a zebra is to a rhinoceros. It is curious, by the way, that so much is often made of there being an 80 or so million-year gap between the latest known kinds of fossil coelacanths and the present-day kind. There are many major groups of living animals for which there are *no* known fossils, providing what would seem to be an even more remarkable "gap" of effectively infinite length. There are also longer finite gaps than 80 million years; but, in most cases, hardly anyone other than specialists ever mentions them, let alone writes popular books about them, because the present-day representatives of the groups in question became known before the fossil ones did.

I agree with Riddell that the existence of the living coelacanth does nothing to give respectability to cryptozoology. . . . Until the cryptozoologists can point to incontrovertible proof of the existence of even one of the fantastic creatures *whose existence they specifically predict* (e.g., Loch Ness monster, bigfoot, living African dinosaurs, etc.), *or through their own efforts* turn up an extraordinary previously unknown creature that neither they nor anyone else had predicted existed, their significant contributions to zoological knowledge will remain, as at present, zero.

Ronald H. Pine
Illinois Mathematics and
Science Academy
Aurora, Ill.

Book reviewer Paul T. Riddell, says "Contrary to the popular refrain of the 'unknown' coelacanth, [Keith S.] Thomson points out [in *Living Fossil*] that the coelacanths were well known to the islanders in the Comores. . . ."

However, what Thomson actually wrote is the opposite:

> In their overnight fishing [Ahmed Hussein] Bourou and Soha had caught many fish, and they managed to sell all of them at the morning market on the beach except the one that turned out to be a coelacanth. There is an oddity here in that [Prof. Margaret] Smith later reported that the fish was well known to Comoran fishermen, who never kept them when they were caught because they had no value for food; the local name was gombessa or ngombessa. Affane Mohamed is quite clear that the fishermen did not recognize the fish either as something seen before or as a fish depicted on the schoolhouse wall. In fact it was the local hairdresser, Abdallah Houmadi, who spotted the fish at the market and, although he also did not recognize it, told Affane Mohamed about it. . . .

In other words, the coelacanth was not recognized as a coelacanth, nor did the natives even have a name for coelacanth, but the fish was recognized from the poster distributed by the South African and English ichthyologists. . . .

Thus the myth (started by Professor Smith) was that the coelacanth was well known to the Comoran fishermen. Riddell got it backwards.

The coelacanth was unknown to the Comoran fishermen.

Shawn Tiffany
Washington, D.C.

The Mims affair

About the Piel-Mims affair: It is the old problem of where to draw the line. In the nature of things people will draw it in different places, and if there is any neat formula for choosing the "right," I do not know it. If it had transpired that Mims was a flat-earthian, most would, I suspect, have agreed that the poor fellow needed a screw tightened and should not be on the *Scientific American* staff. Still, nobody but a few astronauts has been into outer space and directly perceived the planet's globularity; so flat-earthians can say that its roundness has not been proved to *them.* And as far as evidence goes, that for evolutionism vs. creationism is about as strong as that for the roundness of the earth.

L. Sprague de Camp
Plano, Texas

Mims's final response to Martin Gardner

In the same issue of *SI* that Paul Kurtz decries ad-hominem remarks, Martin Gardner has for a second time stereotyped me a "fundamentalist" (Follow-Up, Winter 1992). I am a conservative, evangelical Christian, and there is a significant difference.

Also for the second time, Gardner falsely writes that I am unsure whether Eve had hair. Gardner may have asked someone else about Eve's hair, but he never asked me. As for her navel, I responded in the context of the old riddle that I assumed he knew.

Gardner also ridiculed the fact that I am editor of *Science Probe!*—"a handsome new science magazine." Scientific writings stand or fall on their own merit. Would Gardner reject the writings of Galileo, Newton, Bacon, Kepler, Linnaeus, Pasteur, and a host of others because of their abiding faith in God? Would he have written for *Scientific American* had he known its founding editor, Rufus Porter, advocated in its pages belief in a Creator God?

What is puzzling about all this is that Gardner has assured me that he, too, believes in a "creator God" who is also a "personal God." Although Gardner believes God created life through evolution, he has also assured me that his theism does not preclude the possibility that God is capable of creating life spontaneously and without evolution.

Gardner's defense of his former employer, *Scientific American,* is misplaced. He knows that to this day the magazine's staff remains divided over the issue. He knows that I was asked more about abortion and my Christian faith than about evolution. He also knows about the duplicity of the magazine's editor, who denied his promise to buy and publish three of my columns. The columns were published only after the magazine's president intervened. Moreover, in Gardner's first report about this unfortunate matter, even he cited the transcript in *Harper's* (March 1991) in which the following exchange appears:

> MIMS: Prior to the visit to your offices, there was never even a hint that religion would become an issue.
> PIEL: Forrest, come on, that's why I had the meeting with you.

Gardner also knows that the American Association for the Advancement of Science issued a statement on my behalf after the severing of my relationship with *Scientific American,* which reads, in part,

A person's private behavior or religious or political beliefs should not serve as criteria for publication. We emphasize, in particular, the consensus of the Committee that even if a person holds religiously-derived beliefs that conflict with views commonly held in the scientific community, those beliefs should not influence decisions about scientific articles unless the beliefs are reflected in the articles.

The presence of this letter in *SI* affirms this journal's endorsement of these principles. Although Martin Gardner and the editor of *Scientific American* have withheld theirs, I shall continue my 25-year habit of reading Gardner's writings and *Scientific American*.

Forrest M. Mims III
Seguin, Texas

Cold Fusion goose

When I read the article "Cold Fusion Chicken" in the Winter 1992 *SI*, my thoughts went back 35 years, to my student days. Around 1957 or 1958 I read a science-fiction story by Isaac Asimov.

The title of the story was "Pâté de Foie Gras," and dealt with nuclear reactions in the liver of a goose. The goose took in oxygen, and excreted eggs with gold shells. Unlike Kervran, as reported in *SI*, Asimov got his nuclear reactions right. He even mentioned that the goose somehow managed to deal with the extra positrons released when protons changed into neutrons, to give the required stability mentioned in the footnote to the *SI* article.

This, of course, was good science fiction, and not science fact. The story from New Zealand is also science fiction—but very bad science fiction.

Ken Smith
St. Lucia, Queensland
Australia

Lucian of Samosata

I appreciate E. F. Bleiler's kind comments (Letters, Spring 1992) on my article on Lucian of Samosata (*SI*, Fall 1991). I did make the mistake of relying on a translator's note suggesting that Lucian was influenced by Hippolytus's *Refutation of All Heresies*. Lucian was probably born about A.D. 120; the accepted dates for Hippolytus are A.D. 170-236.

Walter F. Rowe, Ph.D.
Dept. of Forensic Sciences
George Washington Univ.
Washington, D.C.

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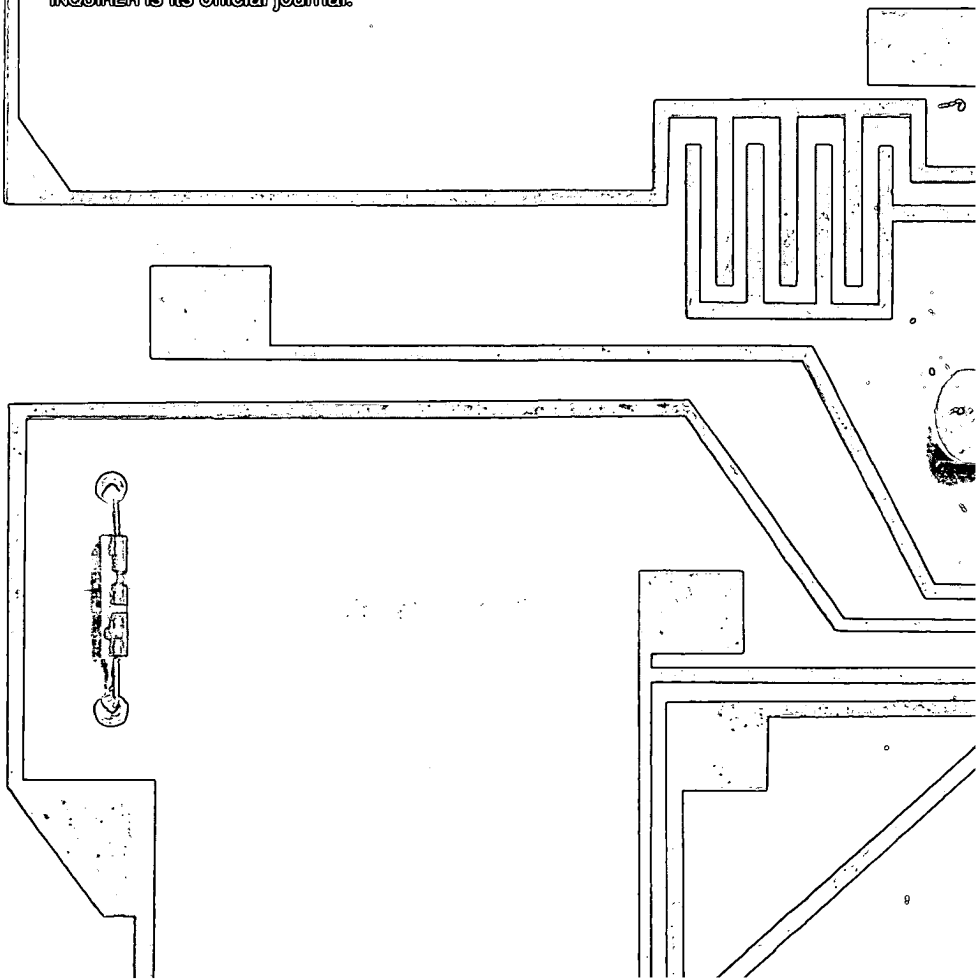
The Committee for the Scientific Investigation of Claims of the Paranormal attempts to encourage the critical investigation of paranormal and fringe-science claims from a responsible, scientific point of view and to disseminate factual information about the results of such inquiries to the scientific community and the public. It also encourages critical thinking, an appreciation of science, and the use of reason in examining important issues.

To carry out these objectives the Committee:

- Maintains a network of people interested in critically examining paranormal, fringe-science, and other claims, and in contributing to consumer education.
- Prepares bibliographies of published materials that carefully examine such claims.
- Encourages and commissions research by objective and impartial inquiry in areas where it is needed.
- Convenes conferences and meetings.
- Publishes articles, monographs, and books that examine claims of the paranormal.
- Does not reject claims on a priori grounds, antecedent to inquiry, but rather examines them objectively and carefully.

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